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NOTES ON GENERA OF PANICEAE. I.

BY AGNES CHASE.

One of the chief distinguishing characters of this tribe of grasses is the single fruit, composed of the more or less indurated lemma and palea, the latter firmly clasped by the margins of the lemma (rarely loose, as in *Leptocoryphium* and *Hymenachne*), enclosing the free grain. This simple arrangement is variously modified in the different genera. After several years' study of the fruits of this tribe the writer proposes to offer this and subsequent papers on the genera with special reference to the fruits, figuring and describing the fruit of the type species of each genus.

It may be well to state why the character of the fruit is held to have superior generic value. It is because: 1. The character of the fruit is constant in the same species. The first glume may be present or obsolete in *Paspalum distichum* L., *P. Drummondii* Vasey, *P. bifidum* (Bertol.) Nash, and in a few others, not only in the same species but in the same specimen, but within are always the same plano-convex, chartaceous-indurated fruits, the lemma with inrolled margins, the palea included at the apex as well as on the margins; *Reimaria oligostachya* Munro may lack but one instead of both glumes but the fruit remains constant; *Echinochloa crus-galli* (L.) Beauv. may have very long awns or be mucronate only, but the fruit will have the characteristic abruptly acuminate apex, the palea free at the summit. 2. The fruit with but slight modifications is constant for greater or smaller groups of similar species; that is, taking the fruit as a generic character it assembles species which show other resemblances, and does not arbitrarily assemble those which show no close affinity, as does the character of the presence of the first glume in *Paspalum*, which places in *Dimorphostachys*, founded on *Paspalum monostachyum* H. B. K., such diverse species as *P. Drummondii* Vasey and *P. Schaffneri* Fourn., when both have

nearer relatives left in the genus *Paspalum*. The foregoing does not mean that the fruit is held to be the only generic character but merely that it is a strong one which has not received the attention it deserves; while it is held that any generic character must be constant in a species and assemble species having other affinities. Such a character is the reversed position of the spikelets in *Axonopus* Beauv. (*Anastrophus* Schlecht.). The fruits alone would not separate this genus from *Paspalum*, but not one of the many specimens of the several species examined shows a spikelet placed otherwise than with the back of the fruit turned from the rachis.

These studies are based on the material in the National Herbarium where all the genera of this tribe are represented, most of them by a large series of specimens. The figures* and descriptions are drawn from mature or nearly mature fruits; since the spikelets fall at maturity it is difficult to find perfectly ripe fruit in herbarium specimens.

The present paper is confined to that group of Paniceae in which the fruits are cartilaginous-indurated (not rigid) papillose, and usually dark colored; lemmas and paleas alike in texture, the lemmas with more or less prominent, white, hyaline margins not inrolled.

KEY.

- | | |
|---|-----------------------|
| Lemma boat-shaped, margin narrow | <i>Anthænantia</i> |
| Lemma convex only. | |
| Palea not inclosed above, lemma hyaline at the summit. | <i>Leptocoryphium</i> |
| Palea inclosed, lemma with broad hyaline margin nearly to the base. | |
| Fruit lanceolate-acuminate, second glume and sterile lemma clothed with long hairs exceeding the spikelet, grain unequally biconvex | <i>Valota</i> |
| Fruit elliptic; second glume and sterile lemma clothed with short hairs or nearly glabrous, grain plano-convex in section. | |
| Spikelets disposed in 1-sided racemes which are digitate or racemose | <i>Syntherisma</i> |
| Spikelets in panicles divergent at maturity | <i>Leptoloma</i> |

GENUS ANTHÆNANTIA Beauv. 1812. Agros. 48. t. 10. f. 7.

Axis paniculatus: Panicula subsimplex.—Glumæ subaequales, concave, herbaceae.—FLOSC. INFER. neut.: Paleæ membranaceae, oppositæ, Paleis

* The figures are all magnified $\frac{1}{2}$ diameters.

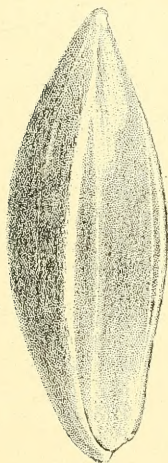
hermaphroditis contrariè dispositæ.—FLOSC. SUPER. hermaph. : Paleæ subcartilagineæ.—SPEC. *Phalaris villosa* MICH.

Phalaris? villosa Michx. 1803. Fl. Bor. Am. 1: 43. "HAB. in sylvis sabulosis Carolinæ."

Just what is meant by the paleae of the neuter floret placed contrariwise to those of the perfect floret it is difficult to decide. The figure shows such an empty floret consisting of a small lemma and palea placed laterally against the palea of the fruit. Kunth (Rev. Gram. 1: 217) reducing the genus to *Panicum* with the specific name of *ignoratum*, remarks that "Beauvois who never soaked the spikelets before examining them nor used a needle to open them" mistook the torn margins of the sterile lemma for a 2-valved floret.

Aulaxanthus Ell. 1816. Bot. S. C. & Ga. 1: 102.

"Flores paniculati. Calyx 2-valvis, 1-floris; valvis æqualibus, sulcatis Corolla 2-valvis, subæqualis."



Two species, *A. ciliatus* and *rufus* are described, and "Phalaris villosa? Michx." is given under the first. Though the generic description says the spikelets are 1-flowered, under *ciliatus* is stated: "at the back of the interior valve occurs a neutral floret, 1-valved, ovate, 2-cleft, green."

Aulaxia Nutt. 1818. Gen. 1: 47. Description is nearly identical with that of Elliott, "1-flowered, with the rudiment of a second" added; *Aulaxanthus* is given as synonym; no reason is assigned for changing the name.

These three generic names are founded on the same species.

Description.—Spikelets in narrow panicles, obovoid, first glume obsolete, second glume and sterile lemma subequal, very broad, with 5 strong nerves, the very thin internerves deeply folded and densely clothed with long hairs, the sterile lemma enclosing a small palea and sometimes a staminate flower; fruit as long as the glume, plano-convex, subacute, chestnut brown, the lemma boat-shaped, the 3 nerves visible; the white or pale margins very narrow; palea-enfolded its entire length, the 2 nerves visible; grain in section plano-convex.

GENUS LEPTOCORYPHIUM NEES. 1829. AGROS. BRAS. 83.

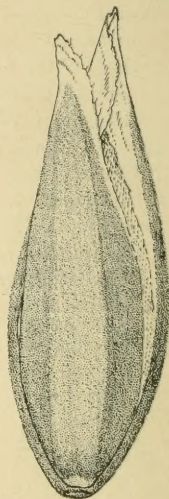
Calyx uniglumis, biflorus, gluma inferiore, deficiente. Flosculus inferior neuter, uniglumis * * * Flosculus superior hermaphoditus, calycis longitudine, in fructu persistens chartaceus (nec induratus), valvulis attenuatis apice membranaceo-hyalinis lacero-ciliatis. [Whence the name from "*λεπτός* tenuis et *κορυφή* apex."]

The first species under this genus is *L. lanatum* (H. B. K.) Nees, based on *Paspalum lanatum* H. B. K. 1815. Gen. Pl. et Sp. 1: 94. t. 29. "Crescit in regno Mexicano prope Venta del Cameron et Alto del Peregrino."

Roemer & Schultes (1817. Syst. Veg. 2: 322) transfer this species to *Milium*, in which disposition of it they are followed by Kunth (1829. Rev.

Gram. 497), and Trinius (1834. Mem. Acad. St. Petersburg. VI. 3² : 121). Benthams (1881. Journ. Linn. Soc. Bot. 19 : 39) transfers it to *Anthaenantia* stating: "From these [N. Am. *Anthaenantia*] I can not separate generically the South American *Leptocoryphium* Nees, which besides some slight specific characters only differs from the North American species in the second glume being constantly, instead of occasionally only, empty." Hemsley (1885. Biol. Cent. Am. Bot. 3 : 483) follows Benthams; Fournier (1881. Mex. Pl. 2 : 13) upholds *Leptocoryphium*.

Description.—Spikelets in narrow panicles, lanceolate; first glume obsolete; second glume and sterile lemma 3 and 5 nerved, the internerves, which are not broad and infolded (or plaited) as in *Anthaenantia*, each with a row of long coarse hairs arising from tubercles (the tubercles sometimes obscure), the second glume shorter than the sterile lemma which equals the fruit and which is empty; fertile lemma slightly cartilaginous-indurated, minutely papillose (the papillae finer than in any of the other genera), chestnut with a white, delicately hyaline, summit, lacerate and often sparingly ciliate, a narrow hyaline margin extending down the sides to about the middle; on the back near the base is a small impressed area thin and white; palea with summit and margins like those of the lemma, not enclosed above, the 2 nerves obscurely visible; grain oblong-elliptic, in section plano-convex.



As shown by the fruit this seems to be, as Nees considered it, most nearly allied to *Valota* (*Trichachne* Nees) from which he separated it chiefly on the absence of the first glume. The inflorescence is like that of *Anthaenantia*, which it resembles also in lacking the first glume, but differs from in lacking the neuter palea or staminate flower and in the convex, not boat-shaped, lemma with a broad hyaline summit. It differs from both *Valota* and *Anthaenantia* in the fruit open at maturity. (A large number of specimens were examined and none in or past bloom were found closed.) Since this species fits so poorly in any other genus it seems wisest to maintain the one Nees established for it. Nees' single other species of *Leptocoryphium* we have not seen.

= *Trichachne* Nees
(GENUS VALOTA ADANS. 1763. FAM. PL. 2 : 495.)

Gramen. Avenae. Sloan. t. 14. f. 2. Couronne de la gaine des feuilles : Membrane médiocre. Fleurs : Panicule étagée. Calice : Ovoïde, sans arêtes, à 3 bales velues. Corolle : Sans arêtes.

The reference to Sloane serves to identify the genus, which the very insufficient description would not do, and fixes its identity with *Andropogon insulare* L.

Andropogon insulare L. 1759. Pugill. Jam. 30; and Sp. Pl. Ed. 2. 1763. 2 : 1480. In the Pugillus no citation is given; in the Species Plantarum

the previous publication by Linnaeus is cited, and also Brown Jam. 365, and Sloane, 1 : 43. t. 14. f. 2. "Hab. in Jamaica."

Brown (l. c.) after his polynomial cites Sloane t. 14.

Sloane's figure (l. c.) is an excellent representation of the upper portion of the plant, a leaf and overmature panicle.

Panicum lanatum Rottb. 1776. Descr. Pl. 3. Based on *Andropogon insulare* L.; the same reference to Sloane is also given. Here follows the first adequate description of the species, even the fruit being described: "*Corollæ valvæ 2 lanceolatae, concavae, acutissimæ, membranaceæ.*"

Milium villosus Sw. 1788. Prod. 24. Based on *Andropogon insulare* L.

Beauvois 1812. Agros. 150, in the index refers *Andropogon insularis* to *Monachne*, but this species is not mentioned under that genus on p. 49.

Panicum leucophoeum H. B. K. 1815. Nov. Gen. et Sp. 1 : 97. Based on *Andropogon insulare* L. This species and *P. adscendens* H. B. K., which is *Syntherisma sanguinalis* or a close ally, are placed together under "3) Spicis verticillatis, fasciculatis aut paniculatis (Digitariæ plurimæ)."

Panicum insulare Meyer. 1818. Prim. Fl. Esseq. 60. Based on *Andropogon insulare* L. The "valves of the corolla" are given as coriaceous with membranaceous margins.

Acicarpa Raddi. 1823. Agros. Bras. 31. with one species *A. sacchariflora* Raddi l. c. t. 1. f. 4. This is given on the authority of Nees. We have not seen the original publication.

Trichachne Nees. 1829. Agros. Bras. 85.

(α θριξ capillus et ἀχνη gluma.)

Calyx bivalvis, subbiflorus, gluma inferiore minuta. Flosculus inferior univalvis vel bivalvis hirsutus, neuter; superior hermaphroditus, valvulis membranaceis mucronatis Caryopsis flosculi valvulis membranaceis vestita

* * * Inflorescentia : racemi elongati, simplices, unilaterales, verticillatim paniculati. Spiculæ geminae ternaeve, altera brevius pedicellata.

* * * Flosculus hermaphroditus * * * bivalvis, glaber, membranaceus, valvulis lanceolatis in mucronum subulatum attenuatis ad fructum persistentibus membranaceo-chartaceis caryopsin tegentibus neque cum eadem induratis. * * * Differt a *Panico* praesertim gluma flosculi hermaphroditæ, * * * at minime crustaceo seu cartilagineo indurato sed semper flexili.

Acicarpa Raddi 1823. Agros. Bras. 31. t. 1. f. 4. is cited as synonym and a note of explanation added that the name is expunged because of its similarity to *Acicarpha* Juss. [1803]. Nees' first species is *Trichachne insularis* (L.) Nees, based on *Andropogon insulare* L. Five other species are included, *T. sacchariflora* (Raddi) Nees, and four new species from Brazil, *T. recalva*, *tenuis*, *velutina*, and *ferruginea*, the last two of which Nees says he saw in the Royal herbarium at Berlin.

Grisebach (1864. Fl. Br. W. I. 557) places *Panicum insulare* and *P. saccharatum* Buckl. in *Tricholaena*; Stapf (1898, in Fl. Cap. 7 : 382) transfers "*Panicum leucophaea* Sw." to *Digitaria*, remarking, "the structure of the spikelets is * * * as in *Digitaria*." Stapf probably means *P. leucophoeum* H. B. K., which is a typonym of *A. insulare* L. Swartz did not publish the name given by Stapf. Millspaugh and Chase (1903, Fl. Yucatan,

Panicum duehassingii Steud.

Field Col. Mus. Bot. 3 : 23) transfer *T. insularis* to *Syntherisma*, remarking :

"That this species belongs in the genus *Syntherisma* rather than in *Panicum* is shown chiefly by the fruiting glumes which are of the form characteristic of the former, having a floral glume with hyaline margins not inrolled."

Description.—Spikelets in pairs, short-pedicel in 2 rows along one side of a narrow rachis, the slender racemes erect or nearly so, solitary or fascicled along a common axis forming a narrow panicle; spikelets lanceolate, first glume minute, glabrous, the second and sterile lemma usually as long as the fruit or longer, 3-5 nerved, copiously clothed with long silky hairs (in one species, only, the silky hairs are not long and dense); fruit lanceolate, usually brown, the flat, white, hyaline margins broad; grain ellipsoid, in section unequally biconvex.

This genus is very closely allied to *Syntherisma* Walt. One species, *Panicum Pittieri* Hack., has the inflorescence of *Valota*, but the hairs on the second glume and sterile lemma are not long and copious, and the second glume is shorter than the fertile lemma as in some *Syntherismas*.

But considering the diverse aspect of the two genera as a whole it seems wisest to regard them as distinct.

The following species are transferred to this genus:

Valota insularis (L.) = *Trichachne insularis* (L.) Nees
Andropogon insularis L. 1859. Pugill. Jam. 30.

Valota saccharatum (Buckl.) *T. saccharata* (Buckl.) Nash = *T. californica* (Benth.) Chase
Panicum lachnanthum Torr. 1856. Pac. Rail. Rep. 7³ : 21, not Hochst. 1855.

Panicum saccharatum Buckl. 1866. Prel. Rep. Geol. & Agr. Surv. Tex. App. 2. "Middle Texas."

Trichachne saccharatum (Buckl.) Nash. 1903 in Small Fl. So. U. S. 83.

Valota Pittieri (Hack.) = *Trichachne pittieri* (Hack.) Hitchc.
Panicum Pittieri Hack. 1901. Oest. Bot. Zeitsc. 51 : 367. "Costarica: in ripa rivi Rio Tirili prope San José leg. Tonduz: Pittier distribuit sub nro. 6945."

The species represented in American herbaria by Nealley's Texas collections and passing under the name *Panicum tenerrimum* Kunth, (based on *Trichachne tenuis* Nees) does not well agree with Nees' description. Since authentic specimens of this and Nees' other Brazilian species have not yet been seen, his species and the Texas form are left for future study; and to avoid the possibility of making unnecessary combinations by taking up possible synonyms these species and an Australian one with stramineous fruits are not here transferred to this genus.

GENUS SYNThERISMA WALT. 1788. FL. CAROL. 76.

Digitaria Haller 1768. Stirp. Helv. 2 : 244 not Adans. 1763, nor Heist. 1759, though Haller gives Heister and Adanson as authors of his *Digitaria*; but his description, though he evidently makes an effort to harmonize it



V. Hitchcockii

= *Digitaria*
Heist

with those of Heister and Adanson by emphasizing the "excavations" of the rachis, applies not to *Tripsacum* but to the grasses so long known as *Digitaria*, and his pre-Linnaean references lead to *P. sanguinale* L.

Antiquum nomen, & characteristicum, reddo plantis nostris, quæ adeo vehementer a LINNÆNIS *Panicis* abludunt, ut nullo modo eo referri possint. Receptaculum Tritici, alternis scrobibus excavatum. Ad eas scrobes applicantur flosculi petiolati. Calyx biglumis, lineatus, altera gluma parva, mucronata, altera majori faciei floris respondente, lineata: ita mucronata, compressa, ovato lanceolata uniflora, locusta oritur. Flos durus, nitens, siccus, convexus inde, hinc complanatus, & linea quasi divisus, non tamen penetrante. Nonquam satis potui distinguere divisionem in duas glumas. In cavea certe undique clausa semen sedet, compressum, planum.

Under his first species, to which Haller, who evidently opposed such an innovation as a binomial system, applies a polynomial, "LINN. p. 84" is cited, with Linnaeus' description of *P. sanguinale* used as a polynomial, the name *sanguinale* being omitted. The reference is to the 1762 edition of *Species Plantarum*. For discussion of *Digitaria* Heistersee Hitchcock, Bot. Gaz. 38 : 298, and Nash; Bul. Torr. Bot. Club 25 : 289.

Panicum sanguinale L. 1753. Sp. Pl. 57. "Spicis aggregatis, basi interiore nodosis, flosculis geminis muticis, vaginis foliorum punctatis. * * * Habitat in America, Europe australi."

The specimen under this name in the Linnaean herbarium is the traditional *P. sanguinale* fide Prof. A. S. Hitchcock who has seen it. The first reference after the description is to Royen Fl. Leyden 55, where, after the polynomial quoted by Linnaeus, Sloan. Hist. 1 : 113, t. 70, f. 3 is cited. The second reference is to Gron. Virg. 154 [error for 134]. Gronovius refers to Clayton n. 457. Linnaeus' reference (Sp. Pl. 57) to Sloane 1 : 113 t. 70 f. 2 is evidently an error. The polynomial and figure cited in Royen applies to *P. sanguinale*.

Syntherisma Walt. 1788. Fl. Carol. 76.

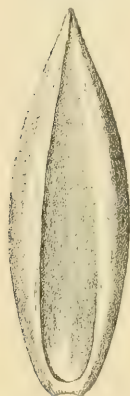
Cal. 1-florus, 2-valvis: valvulis interiore minore recta, exteriore lateribus corollam subamplexante. *Cor.* 2-valvis: valvulis magnitudine et figura valvulae majori calycis simillimis. * * * Semen unicum, calyce corollaque persistentibus vestitum.

The first species is *S. præcox* Walt. "No specimen in [Walter's] herbarium. There is not much doubt but this refers to *Panicum sanguinale* L. (*Digitaria sanguinalis*), as stated by Elliott and Michaux." Hitchcock, Sixteenth Ann. Rept. Mo. Bot. Gard. 44.

Michaux (1803. Fl. Bor. Am. 1 : 45) includes *Syntherisma præcox* Walt. as synonym under *Digitaria sanguinalis* Scop.

This group has been held to be a genus or reduced to a section of *Panicum* according, seemingly, to the weight given its form of inflorescence. Nees, while noting the less indurated and "always pliable" lemma of *Trichachne*, does not seem to have noted that the same is true of the group he placed as section *Digitariae* of *Panicum*, nor that the differences from *Panicum* which he points out for *Trichachne* do not separate that genus from his section *Digitariae*. The form of inflorescence does not clearly distinguish this genus from *Panicum*, since the species known as *Panicum Perrotteti*

Kunth (*Paspalum Perrotteti* Hook f.) and its close allies have sparingly branched racemes more or less naked at the base forming a panicle not greatly unlike that of *Panicum proliferum* and yet are true *Syntherisma*s as shown by the spikelets and especially by the cartilaginous-papillose lemma with flat, hyaline margins. Hooker f. (1896 Fl. Br. Ind. 7: 10) places these and other species of Section *Digitaria* in *Paspalum*, saying "As above defined, *Paspalum* includes the *Digitaria* section of *Panicum*, which appears to me to be artificially placed in the latter genus, because of the occasional presence of a very minute scale-like glume at the base of what is the 3rd gl. of *Panicum* (that opposite the flg.). This minute glume which is present or absent even in the same species, is nerveless and never embraces that above it, as the lowest glume always does* in *Panicum* proper." The first glume is not only present or absent in the same species in *Syntherisma*, but sometimes in the same specimens, as in those of *P. Perrotteti* in the National Herbarium.



Nash (Bul. Torr. Bot. Club 25: 289) while contending that *Syntherisma* is as worthy of generic rank as are *Paspalum*, *Anthraenantia*, *Eriochloa*, *Isachne*, *Ichmanthus*, and *Tricholena* fails to point out why it is so, and adds: "Our own view is that *Syntherisma* is more nearly related to *Paspalum* than to *Panicum*, and if its union with either genus were desirable it would certainly be with the former and not with the latter." If the cartilaginous-papillose lemma with flat hyaline margins be taken for the chief generic character, *Syntherisma* is at once clearly distinguished from both *Panicum* and *Paspalum*, with no intermediate species.

Description.—Spikelets solitary or in 2's or 3's, subsessile or short-pedicelled, alternate in 2 rows on one side of a 3-angled winged or wingless rachis, the slender racemes usually more or less spreading, usually digitate or in approximate fascicles at the summit of the culm, rarely distributed along the axis; spikelets lanceolate or elliptic; first glume minute or wanting, the second glume equalling the sterile lemma or shorter, fruit lanceolate or elliptic, the flat, hyaline margins white or pale; grain sub-elliptic, in section plano-convex or slightly concavo-convex.

The affinities of *Syntherisma* are with *Valota* on the one hand and *Anthraenantia* on the other. To the former it is allied through *V. Pittieri* and the species mentioned above as "*Panicum tenerimum*" from Texas. *Syntherisma* approaches *Anthraenantia* through *Panicum* (≡ *Digitaria*) *adustum* Nees and *Anthraenantia Hackeli* Arech. allied species, and *Panicum badius* Scribn. & Merr., which are placed in *Syntherisma* rather than in *Anthraenantia* on the following characters: Spikelets in pairs in 2 rows along one side of a triangular rachis; a minute first glume present (though this has little weight); second glume not equalling the sterile lemma (which is empty or contains only a nerveless rudiment of a palea), neither of them broad with deeply folded internerves as in *Anthraenantia*; lemma not boat-shaped, the hyaline margins broad. In addition to the species con-

* Hooker was probably not acquainted with the Dichotomous *Panicums* in which he first glume is often nerveless and seldom embraces the second.

sidered by Nash (l. c.) in his treatment of the genus the following are here transferred:

Syntherisma adusta (Nees) *J. Griseb.*

Panicum adustum Nees. 1829. Agros. Bras. 101. "Habitat in Brasilia meridionali. (Sellow.)"

Syntherisma badia (Scribn. & Merr.) *J. Fernald*

Panicum (Syntherisma) badium Scribn. & Merr. 1901. U. S. Dept. Agr. Div. Agros. Bul. 24: 12. "Sierra de San Felipe, State of Oaxaca" 915 C. L. Smith.

Syntherisma Hackeli (Arech.)

Anthraenantia Hackeli Arech. 1894. Anal. Mus. Nac. Montevideo 2: 96, t. 5. *Figueira*, Uruguay.

Syntherisma velutina (DC.)

Milium velutinum DC. 1813. Cat. Hort. Monsp. 126. "Hab. in Mexico." *Paspalum? velutinum* Kth. 1829. Rev. Gram. 1: 27. *see Digitaria mollissima* 1827. *Palm.* "Represented by Pringle 6623 and 9565."

Syntherisma Perrotteti (Kth.)

Panicum Perrotteti Kth. 1829. Rev. Gram. 2: 395. t. 3. "Crescit in Senegalia, prope Walo."

Syntherisma stenotaphroides (Nees)

Panicum (? Digitaria) stenotaphroides Nees 1854 in Steud. Syn. Pl. Glum. 1: 41. "Ins. Choin legit Cuming."

This and an allied species are peculiar in having a thickened rachis, the solitary spikelets sunken in the alternate notches.

Species as yet imperfectly understood are not here transferred.

GENUS LEPTOLOMA GEN. NOV.

Inflorescentia paniculata, panícula pauciflora, maturitate diffusa; spiculae 1-florae, fusiformae, solitariae, aut raro per paria, in pedicellis tenuibus triangularibus; gluma prima minuta aut deficiens, secunda 3-nervis; lemma neutrum 5-7 nerve; fructus ellipticus, acutus; lemma hermaphroditum cartilagineo-induratum, papillosum, marginibus delicatus hyalinas, planis; palea similis; caryopsis oblongo-elliptica lemmate paleaque inclusa, libera. Gramina perennia, caespitosa, ramosa, culmis fragilibus, laminis planis, ligulis membranaceis. Maturitate paniculae se dissipant et pervolvunt Panico capillari similes. Nomen ab *λεπτός* *delicatus* et *λόμα* *margo*.



Inflorescence a few-flowered panicle diffuse at maturity; spikelets 1-flowered, fusiform, solitary or rarely in 2's on slender triangular pedicels; first glume minute or obsolete, the second 3-nerved, nearly as long as the 5-7 nerved sterile lemma, a more or less prominent stripe of appressed silky hairs down the internodes and margins of each; sterile lemma empty or enclosing a minute nerveless rudimentary palae; fruit elliptic, acute, brown; fertile lemma cartilaginous-indurated papillose, with delicate hyaline flat margins, enclosing a palea of the same texture; styles long and delicate, stigmas plumose, the branches more long and slender than in *Panicum*, rather less so than in *Syntherisma*; grain oblongo-elliptic, in section plano-convex; free within the closed lemma and palea. Tufted branching perennials with brittle culms, flat blades,

and membranaceous ligules. At maturity the panicles break away and roll like tumble-weeds. Name from λεπτός delicate and λῶμα border in reference to the hyaline margins of the fertile lemma.

Type.—*Panicum cognatum* Schultes.

Leptoloma cognata (Schultes.)

Panicum divergens Muhl. in Ell. 1816. Sk. Bot. 1 : 130. not H. B. K. 1815. Specimen in Elliott herbarium in College of Charleston.

Elliott gives "Muhl. Cat." without page as authority for this name; in Muhl. Cat. 9 (1813) *divergens* is a nomen nudum.

Panicum divergens Muhl. 1817. Gram. 120. "Habitat in Carolina." Specimen in the Muhlenberg herbarium in Philadelphia Academy of Natural Sciences, marked "Elliott 353." In the same folio with this is a specimen of *Panicum Philadelphicum* marked "M. 112b."

Panicum cognatum Schultes 1824. Mant. 2 : 235. Muhlenberg's description is copied and *P. divergens* Muhl. is cited as synonym, the name changed, doubtless, because of *P. divergens* H. B. K., though this older use of the name is not mentioned. Thus it is the second publication of *P. divergens* Muhl. (that in Muhl. Gram.) on which Schultes bases his *P. cognatum*. Hence the specimen in Muhlenberg's herbarium is the type.

Panicum autumnale Bosc. Spreng. 1825. Syst. 1 : 320.

This name as used by American authors is synonymous with above, but we have not seen Bosc's specimen. Sprengel (l. c.) places the description of *P. autumnale* next to that of *P. divergens* Muhl. The brief description would apply to any *Panicum* with an effuse capillary panicle. It was not known to Sprengel where the specimen came from; "Patria?" he adds to his description, and indicates he saw the specimen in the Willdenow herbarium.

The sheaths and blades of this species, especially the lower ones, are often papillose pubescent, commonly so in Western specimens, though the type is almost glabrous. Pringle 489, Chihuahua, Mexico, represents an extreme form with slightly larger spikelets, having densely silky-pubescent internerves, which would appear to be a distinct species except for the fact that the inter-grades are more numerous than the extreme form. This is the only species of this genus known in the northern hemisphere. Three or four species are found in Australia.

Leptoloma divaricatissima (R. Br.)

Panicum divaricatissimum R. Br. 1810. Prod. 192. Port Jackson, New Holland.

Leptoloma macratenum (Benth.)

Panicum macratenum Benth. 1878. Fl. Australia 7 : 468. "Queensland, Rockhampton, O'Shanesey."

Leptoloma coenicola (F. Muell.)

Panicum coenicolum F. Muell. 1855 in Trans. Vict. Inst. 45. Cudnaka, S. Australia, F. Mueller.

Panicum papposum R. Br. Prod. 192, and *P. nematostachyum* Bailey 1903 in Bot. Bul. Dept. Agr. Queensl. 16 : 2, of which we have not seen specimens, probably belong here. The former is *P. autumnale* F. Muell. Fragm. 8 : 196, not Bosc, fide Benth. Fl. Australia 7 : 469.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON GENERA OF PANICEAE. II.*

BY AGNES CHASE.

The two genera, *Hymenachne* and *Sacciolepis*, discussed in the present paper, while not very closely related, have been confused because of the similarity in the form of the inflorescence of most of the species in each, a spike-like panicle.

GENUS HYMENACHNE Beauv. 1812, Agros. 48. t. 10. f. 8.

"Axis paniculatus: Panícula simplex, *spicæformis*: *Rami conferti*.—Glumæ inæquales, herbacææ, acutæ: infer. multo brevior. FLOSC. INFER neut.: Palea infer. acuta: super. brevissima, *membranacea, hyalina*.—FLOSC. SUPER. hermaphroditus: *Paleæ herbacææ membranacæ acutæ*. * * * SPEC. *Agrostis myuros* Lam. *monostachya* Poir."

The illustration represents the second species mentioned by Beauvois, *Agrostis monostachya* Poir., which according to the American Code,† should therefore be taken as the type of the genus, although Beauvois gives the name *Hymenachne myuros* in the explanation of plate 10, showing that he misunderstood Lamarck's species.

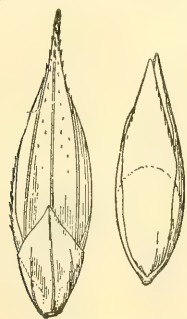


Fig. 1.

Hymenachne amplexicaulis.

Agrostis monostachya Poir. 1810, Encyc. Suppl. 1: 256. "Cette plante a été recueillie à Porto-Ricco, par M. Riedle. (V. s. in herb. Desfont.)"

The type labeled in Poiret's hand, "*Agrostis monostachya* Poir. enc. sup. Reidel Porto-Ricco," was examined by Professor A. S. Hitchcock‡ in the Desfontaine herbarium at Florence. The accompanying figure is drawn from this specimen.

Panicum myuros Lam. (incorrectly given as *Agrostis myuros* Lam.) cited by Beauvois under *Hymenachne* is not the same species as *Agrostis monostachya* Poir., as most subsequent authors seemed to think. The type of this was seen in Lamarck's herbarium in Paris,

* Notes on Paniceae I, with general discussion of the importance of the fruit as a generic character in this tribe appeared in Proc. Biol. Soc. Wash., 19: 183-192. Dec. 1906.

† Canon 15, b.

‡ All the type specimens definitely mentioned as found in the different European herbaria were examined by Professor A. S. Hitchcock in the spring of 1907.

and was found to be a congener of *Sacciolepis striata* (L.) Nash., *Panicum indicum*, and allied species.

Beauvois emphasizes the simple spike-like panicle, and also the real distinguishing character of the genus, the membranaceous lemma and palea, to which latter character the name refers, “De ὑμῆν” Membrana; “ἄχνη Palea.” But, probably because he did not know Lamarck’s species, Beauvois included in *Hymenachne* *P. myuros* which does not have a membranaceous lemma and palea. Subsequent authors have placed in the genus or section *Hymenachne* various *Panicum* allies having a spike-like panicle, but often without other similarity. It is not evident whether Beauvois considered the two species he cites synonymous or not. In the index only *Hymenachne myuros* is given; *A. monostachya* is not formally transferred and is not mentioned in the index.

Roemer & Schultes (1817, Syst. 2: 25) maintain this and others of Beauvois’ new genera without comment.

Trinius (1820, Fund. Agros. 176) upholds *Hymenachne* as a genus with one species, *myurus*, though *Digitaria*, *Monachne* and other genera are included in *Panicum*. Trinius adds the note: “Obs. *Panicis maxime affinis. An hujus generis* (forte tunc emendandi) *Andropogon insularis* L.?” which seems to indicate that he gave greater weight to the membranaceous fruit than to the spike-like panicle. This is assuming that Trinius supposed *H. myurus* and *A. monostachya* to be synonyms. Later (1826, Gram. Pan. 51) Trinius places *Hymenachne* together with *Trichachne*, *Setaria*, *Pennisetum* and other genera in *Panicum* under the following synoptical division “e) *Thyrus* (simplex vel compositus), aut *Racemi compositi* longe plerumque sparsi et jubati. Spiculæ oblongæ l. lanceolatæ, pl. min. inæqualiter dispositæ. Gluma inferior manifesta (*Jubaria*).*)” [“Species quarum radii, quantumvis racemos mentientes, radiolos, distinctos emittunt, ad sectionem sequentem Miliariam referuntur.”] This gives a wholly artificial grouping based solely on the narrow panicle and includes *Chaetochloa*s, various true *Panicums* and allies. *Jubaria* (l. c. p. 159–183) is subdivided into four groups, the third of which, “* * * *Thyrsi* pl. min. compositi spiculæ basi nudæ (absque involucello)” includes *Panicum indicum* L., *P. villoides* Trin., *P. gibbum* Ell. (which belong in *Sacciolepis*), and *P. amplexicaule* Rudge (true *Hymenachne*) under which *Hymenachne myuros* Beauv. and *Panicum myuros* Kunth “(nec Lam.)” are given as synonyms. Trinius observes “Lamarckii gramen, cui ‘folia angusta, convoluta’ certe huc non pertinet.” But *Panicum myuros* Lam. and *P. amplexicaule* continued to be considered synonymous by other authors. Under his fourth division of *Jubaria* Trinius includes *Panicum palustre* Trin. (a true *Hymenachne* having a racemose panicle) between *Panicum leucophæum* Kunth (which is *Valota*) and *P. plicatum* Lam., which belongs in section *Ptycophyllum* of *Panicum*. These details are given only to show that the cause of confusion was the form of the inflorescence.

Nees (1829, Agros. Bras. 273) recognizes *Hymenachne* as a genus, but like Trinius groups with it the allies of *Panicum gibbum* Ell., though he places the following observation after them: “Hac in specie ac in præce-

dente [*H. fluviatilis*, which is the same as *Panicum villoides* and *H. campestri*] flosculus hermaphroditus glumis et neutro flosculo brevior est multo, non vero herbaceus ut in *H. myuro*, sed subcartilagineus." *Panicum paludicola* Nees, a *Hymenachne*, and *P. striatum* Lam., a *Sacciolepis*, are given among true *Panicums*.

Desvaux (1831, Opus. 82) transfers *Agrostis monostachya* Poir. to *Panicum*, changing the name to *P. Hymenachne* Desv. He observes that this plant had been confounded with *Agrostis* [*Panicum*] *myuros*, which was very different.

Kunth (1833, Enum. Pl. 1: 86) under division 5 includes a miscellaneous group of *Sacciolepis*, *Hymenachne*, *Eriochloa* and other allies, as well as several species of *Panicum* itself.

Trinius (1833, Pan. Gen. 165) includes about the same group under his section *Virgaria* of *Panicum*.

Nees (1841, Fl. Afr. Aust. 50.) makes a section *Curviflora* of *Panicum* for two species of *Sacciolepis*.

Steudel (1854, Syn. Pl. Glum. 2: 101) includes in the genus *Hymenachne* four names referable to *Sacciolepis*, and two (which are, however, synonyms) to *Hymenachne*; a seventh species, which is probably a *Sacciolepis*, he includes with the mark of doubt.

Grisebach (1864, Fl. W. I. 553) includes in the genus *Hymenachne* one species which belongs there and two which belong to *Sacciolepis*.

Doell (1877, Mart. Fl. Bras. 2²: 231) in the first part of the section *Miliaria* of *Panicum* gives seven species, five of which are referable to *Sacciolepis*, one to *Hymenachne*, and one probably to *Steinchisma*. *Panicum auriculatum*, a *Hymenachne* with ascending, not oppressed, panicle branches, is placed in the second part of the section in which most of the species are true *Panicums*. It is worthy of note that Doell uses the name *Panicum myuros* Lam. for the species to which the type really belongs, stating that he saw the specimen in the Paris Museum. Under *Panicum amplexicaule* Rudge, he straightens out the hitherto confused synonymy of this species.

Bentham (1878, Flora Australiensis 7: 465) makes a section *Myuroideæ* of *Panicum* under which he places three species, two of which belong in *Sacciolepis* and one in *Hymenachne*.

Fournier (1881, Mex. Pl. 2: 36) includes eight species in the genus *Hymenachne*, two of which are referable to *Sacciolepis*, three to *Hymenachne*, and two to *Panicum*. The remaining species, *H. Gouini* Fourn., unknown to us, is probably a *Hymenachne*.

Hackel (1887, Engler & Prantl. Pfl. Fam. 2²: 35) recognizes *Hymenachne* as a section of *Panicum* with spike-like panicles and slightly indurated glumes. No species are mentioned.

Hooker (1896, Fl. Brit. Ind. 39) places seven species under *Hymenachne* as a section of *Panicum*, three of which are referable to *Hymenachne* and four to *Sacciolepis*.

Stapf (1898, Flora Capensis 386) makes a section *Vilfoideæ* for three species referable to *Sacciolepis*.

Description.—Spikelets short-pedicelcd, crowded in slender racemes

which are erect, forming a dense spike-like panicle, or narrowly ascending; spikelets lanceolate, acuminate; first glume $\frac{1}{3}$ to $\frac{1}{2}$ as long as the spikelet, remote, a distinct stipe below the second glume; sterile lemma 5-nerved, acuminate, exceeding the lanceolate stramineous fruit; lemma and palea membranaceous, margins of the lemma thin (not broad and hyaline), not enrolled; palea not inclosed above; grain oblong, at maturity readily falling from the open lemma and palea. Perennial aquatic or semi-aquatic grasses, decumbent at base and rooting at the lower nodes, with rather stout simple stems and long lanceolate blades cordate-clasping at base, except in *Hymenachne montana*. Species seven or eight, confined to the tropics and subtropics.

**Panicles elongated, spike-like.*

HYMENACHNE AMPLEXICAULIS (Rudge) Nees 1829, Agrost. Bras. 276, based on the next.

Panicum amplexicaule Rudge 1805, Pl. Guian. 1: 21. t. 27. Type "ex herb. Rudge" in the British Museum.

Agrostis monostachya Poir. 1810, Encyc. Suppl. 1: 256. (See note above on type.)

Panicum Hymenachne Desv. 1831, Opus. 82. Based on *Agrostis monostachya* Poir.

Panicum myuros of authors not Lam.

In the tropics and subtropics of western hemisphere.

HYMENACHNE PATULA Fourn. 1881, Mex. Pl. Gram. 37. "Bejucal in insula Cuba (Liebm. n. 402.)"

A specimen of this number from Fournier is in the herbarium of the Botanical Garden at Copenhagen. The panicle is less dense than in the preceding.

Known only from Cuba.

HYMENACHNE PSEUDO-INTERRUPTA C. Muell. 1861, Bot. Zeit. 19: 333. "India orientalis, Bengalia et Malacca. Griffith."

Specimens in the National Herbarium from India, Malacca and Java answer to Mueller's description. They differ from *H. amplexicaulis* in having blades narrowly cordate at base, long-attenuate or involute above; and in the longer spikelets with longer-pointed glumes. Nees' description of *P. auritum* Presl (ex Nees 1829, Fl. Bras. 2: 176) seems to apply to this species, but we have not seen the type of either.

HYMENACHNE MONTANA Griseb. 1879, in Goett. Abh. 24: 307. "C ["C = Prov. Cordoba und Santiago del Estero." l. c. 4.] S. Achala." The type is in Grisebach's herbarium at Göttingen, labeled "Achala, Hieronymus 640."

An anomalous species, bearing about the same relation to the typical species that *Panicum Chapmanii* Vas. and related forms bear to *Eupanicum*. A few of the lower spikelets are subtended by a scabrous bristle (a sterile pedicel); first and second glumes sub-equal, much shorter than the sterile and fertile lemmas; fruit as in the type species, except that it is slightly indurated.

Argentina.

***Panicle long and narrow with ascending branches, not spike-like.*

Hymenachne auriculata (Willd.).

Panicum auriculatum Willd. 1825, ex Spreng. Syst. 1: 322. "Amer. austr." The type, labeled "Amer. merid. Humboldt," is in the Willdenow herbarium, Berlin.

Panicum polystachyum Presl 1830, Rel. Haenk. 1: 312. "Hab. in Peruvia." (Not *P. polystachyum* Schult. 1824, Mant. 2: 146.) The type, in the Presl herbarium in the National Museum, Prag, is labeled "Regno montana, Peru."

Brasil and Peru.

see *Panicum panicifolium* (Raddi) Chase

Hymenachne palustris (Trin.).

Panicum palustre Trin. 1826, Gram. Pan. 181. "V. spp. Brasil. (Langsdorff)." The type bearing the label "*Panicum palustre* m. Brasil Langsdorff. In fossis serra dos Orgonos," is in the Trinius herbarium, in the St. Petersburg Academy of Sciences.

Panicum paludicola Nees in Trin. l. c. as synonym sub *P. palustre*; 1829, Agros. Bras. 179. The specimen in Trinius' herbarium is cited and *Panicum palustre* Trin. is given as synonym.

In the *Icones* 2, pl. 218, Trinius reduces *P. palustre* to a synonym of *Panicum frondescens* Meyer, but from Meyer's description and a specimen from Brasil determined by Nees this seems to be a species related to *Panicum stoloniferum* Poir. Plate 218 is drawn from a Brasil specimen, and agrees with the specimens of *P. palustre* in Trinius' herbarium.

Panicle less dense than in the preceding, spikelets larger.

Brasil.

Two species represented in the National Herbarium, one from Uruguay and one from the Philippines, remain to be identified with published names or to be described.

The following species should be excluded from *Hymenachne*, to which genus they have been referred by various authors:

<i>Hymenachne boiviniana</i> Steud.	= Sacciolepis?
<i>Hymenachne campestris</i> Nees	= Sacciolepis.
<i>Hymenachne fluviatilis</i> Nees.	= Sacciolepis.
<i>Hymenachne frondescens</i> (Meyer) Fourn. . .	= Panicum.
<i>Hymenachne indica</i> (L) Buese	= Sacciolepis.
<i>Hymenachne interrupta</i> (Willd.) Buese . .	= Sacciolepis.
<i>Hymenachne leptostachya</i> (Presl) Fourn. .	= Panicum?
<i>Hymenachne myosuroides</i> (R. Br.) Balansa	= Sacciolepis.
<i>Hymenachne myosurus</i> (Rich.) Nees . . .	= Sacciolepis.
<i>Hymenachne myuros</i> (Lam.) Beauv. . .	= Sacciolepis.
<i>Hymenachne phalarioides</i> (R. & S.) Nees .	= Sacciolepis?
<i>Hymenachne phleiformis</i> (Presl) Fourn. .	= Sacciolepis.
<i>Hymenachne polymorpha</i> Balansa	= Sacciolepis?
<i>Hymenachne striata</i> (Lam.) Griseb. . . .	= Sacciolepis.

None of the above species is here transferred.

GENUS *SACCIOLEPIS* NASH 1901, BRITT. MAN. 89.

"A perennial grass with flat leaves and a terminal contracted panicle. Spikelets numerous, readily deciduous when mature, 1-flowered, articulated to the pedicel below the empty scales. Scales 4, the outer 3 membranous, the first scale small, the second one much larger than the rest, many-nerved, strongly saccate at the base; fourth scale much shorter than the third, chartaceous, enclosing a palet of similar texture and a perfect flower. *** [Greek, in reference to the large saccate second scale of the spikelet.]"

The only species given under the genus is *Sacciolepis gibba* (Ell.) Nash (l. c.), based on the following:

Panicum gibbum Ell. 1817, Sk. Bot. S. C. and Ga. 1: 116. No specimen is cited. The type in the Elliott herbarium in the College of Charleston,

consists of a single culm with three leaves and an over-mature panicle. The label in Elliott's writing reads: "*Panicum gibbum* mihi. flor. Aug. Sept. Car. Georg. in locis udis."

Nees (1841, Fl. Afr. Aust. 50) establishes a division *Curviflora*; Bentham (1878, Fl. Austral. 7: 480) a series *Myuroideæ*; and Stapf (1898, Flora Capensis 386) a section *Vilfoideæ* for species referable to this genus. For the history of the disposition of this group by various authors, see the notes under *Hymenachne*.

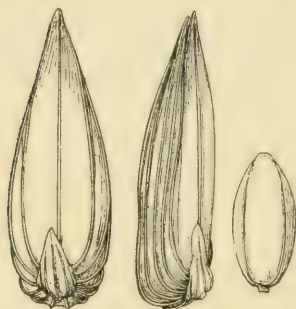


Fig. 2.
Sacciolepis gibba.

Description.—Spikelets short-pediceled on short usually erect racemes forming dense spike-like panicles (except in *P. curvatum* L.), spikelets oblong-conical; first glume small, second glume broad, inflated-saccate, strongly many-nerved; sterile lemma narrower, flat, fewer-nerved, its palea nearly as long, often subtending a staminate flower; fruit stipitate, elliptical, the lemma and palea chartaceous-indurated, the margins of lemma inrolled, the palea not enclosed at the summit. Grasses of wet ground; culms usually branching, and rooting at the lower nodes.

SACCIOLEPIS STRIATA (L.) Nash 1903, Bul. Torr. Bot. Club, 30: 383.

Holcus striatus L. 1753, Sp. Pl. 1048. "Habitat in Virginia paludibus." The type in the Linnean herbarium is "a Gronovius plant numbered 59, upon which Linnaeus has written '7 striatus.'"*

Panicum striatum Lam. 1791, Tab. Encyc. 1: 172. "Carolina. Com. D. Fraser." The type labeled "de la Caroline, fraser, panicum striatum lam." is in the Paris herbarium. Though the same specific name is used it appears that Lamarck did not know *Holcus striatus* L.

Panicum gibbum Ell. 1817, Sk. Bot. S. C. and Ga. 1: 116. (See above.)

Panicum Elliottianum Schult. 1824, Mant. 2: 256. Based on the preceding, the name being changed because of *P. gibbosum* Brown.

* Fide Hitchcock, in note book.

Panicum aquaticum Bosc ex Spreng. 1825, Syst. 1: 319. "Ins. Bermud." A duplicate type was seen in the Webb herbarium in Florence.

Sacciolepis gibba (Ell.) Nash 1901, Britt. Man. 89. (See above.)

***Sacciolepis myuros* (Lam.)**

Panicum myuros Lam. 1791, Tab. Enc. 1: 172. (Misprinted "myruos," but corrected in Enc. 4: 748.) "Ex America merid. Comm. à D. Richard." The type in the Lamarck herbarium in Paris is labeled in Lamarck's handwriting "de Cayenne Leblond *Panicum myuros* lam. ill. gen." In the Encyclopédie (4: 748) the specimen is said to come from Cayenne, communicated by Richard and Leblond.



Fig. 3.

Sacciolepis myuros.

Since this species has been so generally misunderstood a spikelet from the type is illustrated here to show the generic relationship.

Panicum myosurus Rich. 1792, Act. Soc. Hist. Nat. Par. 1: 106. No specimen is cited, but the name is published with a brief diagnosis in a "Catalogus plantarum *** e Cayenna missarum a Domino Le Blond." The type is in the Paris herbarium. It is a somewhat larger specimen than the preceding type.

This species is represented in the National Herbarium by Liebmann Mex. Gram. No. 146.

?*Panicum phleiforme* Presl 1830, Rel. Haenk. 1: 302. "Hab. in Mexico." There are two specimens on the sheet labeled "*Panicum phleiforme* nov. sp. J. S. Presl" in the National Museum at Prag, one ticketed Mexico, the other Luzon. The Mexico specimen is small and slender, but may be referable to *S. myuros*; the spikelets agree with those of Lamarck's specimen, except that they are less acute. *Pringle* 2363, Jalisco, Mex., distributed as *P. indicum* L., seems to be the same as Presl's specimen. More material may show this form to be distinct.

Hymenachne
myosurus
(Rich.) Nees
Agrost. Bras.
276. 1829.

***Sacciolepis vilvoides* (Trin.).**

Panicum vilvoides Trin. 1826, Gram. Pan. 171. "*Hymenachne fluvialis* N. ab Es! in Mart. Fl. Bras. ined. V. spp. Gujan. Brasil. (Fischer N. ab Esenb.)" In the Trinius herbarium there are two specimens in the cover marked "*Panicum vilvoides* m." One is labeled "*Panicum vilvoides* m. *Hymenachne fluvialis* N. ab Es. sub quo nom. mis in Brasil. lectu an. N. ab." The other is labeled "*Panicum* (*Hymenachne*) *vilvoides* Trin. Guyan française." Fischer's name does not appear on either. Since Trinius indicated by "m" or "mihi" the specimen he named, the first specimen mentioned above may be taken as the type. The second specimen is *S. myuros*.

Hymenachne fluvialis Nees 1826, in Trin. (l. c.) as synonym sub *Panicum vilvoides* Trin. 1829, Fl. Bras. 273 "*Panicum vilvoides* Trin. in litt., ex Herb. cl. Fischeri." is cited.

This species is represented in the National Herbarium by Edwall 1066 S. Paulo, Brasil. Other specimens apparently belonging to the same species have spikelets hirsute at the summit.

Sacciolepis strumosa (Presl).

Panicum strumosum Presl 1830, Rel. Haenk. 1: 303. "Hab ad Mont-Rey Californiæ." The type in the Presl Herbarium is labeled "*Panicum strumosum* nov. sp. J. S. Presl"; a second slip reads "Regno montanæ, Haenke." The published locality is clearly a mistake; no species of this group have been found in California. This species is represented in the National Herbarium by *Burchell* 4420, Brasil.

Sacciolepis indica (L.)

Aira spicata L. 1753, Sp. Pl. 63. "Habitat in India." In the Errata at the end of Vol. 2 "spicatum" is changed to "indicum," presumably because of another *Aira spicata* on page 64. "The specimen in the Linnean herbarium is a delicate creeping or spreading plant with many spikes about 1 cm. long with only a few spikelets"—[Hitchcock in notebook]. It is labeled in Linnaeus' hand "*Panicum indicum*." *Aira* has been scratched, and *indica* changed to *indicum*.

Aira indica L. 1753, Sp. Pl. in Errata; 1762, Sp. Pl. ed. 2, 94.

Panicum indicum L. 1771, Mant. 2: 184. Based on "*Aira indica* Sp. plant 94" (the reference is to the second edition).

Hymenachne indica (L.) Buese 1854, in Miq. Pl. Jungh. 377. Based on *Panicum indicum* L.

Of the several species in the National Herbarium from India received as *Panicum indicum* L., that represented by *Duthie* 10,003 from the herbarium of Prof. Hackel seems to be the true *P. indicum*.

Sacciolepis curvata (L.)

Panicum curvatum L. 1767, Syst. Nat. ed. 12: 732. "Habitat in Suratte."

?*Panicum coryophorum* Kunth 1831, Rev. Gram. 2: 387. t. 107. "Crescit in Madagascaria." Communicated by Aubert du Petit-Thouars. Kunth remarks that while the description of *P. curvatum* L. might include his species, it is nevertheless too brief to convince him of the identity of the two, especially since one is from India and the other from Madagascar. The Madagascar specimen in the National Herbarium agrees perfectly with Kunth's figure, but the identity of *P. curvatum* L. and *P. coryophorum* Kunth can only be determined by a study of the types. The two are considered synonymous by Hooker, Stapf and others. This is the only known species with an open panicle. The spikelets closely resemble those of the type species, *S. gibba*.

The following species which belong in this genus are not here transferred for lack of complete data:

Panicum rigidifolium Trin. 1829, Sp. Gram. Ic. 2. t. 214. "Figura ad specimen Brasiliense." The type in Trinius herbarium, St. Petersburg, is labeled "*Panicum rigidifolium* m. 4 Brasil. Langsdorff."

This is an outstanding species with a fruit larger in proportion to the size of the spikelet than in any other species. It is not here transferred because of uncertainty as to the oldest tenable name. Kunth (1833, Enum. Pl. 1: 88) changes the name of *P. rigidifolium* Trin. to *Panicum*

Trinii Kunth because of *P. rigidifolium* (Poir.) Kunth (May 2,* 1829, Rev. Gram. 1: 37). Both names thus date from 1829, and we have not been able to ascertain which is the earlier. An older name than either may apply to this species. Doell (1877, Mart. Fl. Bras. 2^d: 236) uses *Panicum diæcum* Spreng. (1825, Syst. 1: 322) for this species, citing "*Panicum melicoides* Nees ab Esenb. secundum specimen authenticum, viz Poiret." Sprengel's description is very brief, and does not seem to apply to this species; the spikelets are said to be diœcious and the leaves lanceolate. The native country is indicated as unknown, and "*P. melicoides* et poæforme Poir." are cited as synonyms. Nees (1829, Agros. Bras. 191) describes this species under *Panicum melicoides* Poir., giving *Panicum diæcum* Spreng. as a synonym. Since Nees might be expected to have seen Sprengel's specimen it may be that Sprengel's name belongs to this plant, notwithstanding the inapplicable description. The original description of *P. melicoides* Poir. (1816, Encyc. Suppl. 4: 283) could hardly apply to this species. Neither the type of this nor of *P. diæcum* has been seen.

Two other Brazilian species, *Hymenachne campestris* Nees (of which = *Panicum camporum* Kunth is a typonym) and *P. caudatum* Salzm.; and *Panicum interruptum* Willd., of India, and a number of other old-world species of this group are not well enough known to us to be transferred here.

*Fide Sherborn and Woodward in Journ. Bot. 39: 205. 1901.





PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON GENERA OF PANICEAE. III.*

BY AGNES CHASE.

The grasses in *Paniceae* having two forms of spikelet† form one well-defined group, the *Olyrae*, an outstanding genus, *Amphicarpon*, and a small group of polygamous grasses, *Phyllorachis*, *Thuarea* and *Spinifex*, not closely related to each other nor to any other genera in this tribe. The latter group will be taken up in a later paper. In natural systems these forms have been disposed of in various ways, only the more important of which are here considered, as the history of the classification of this tribe will be taken up later.

Beauvois'‡ disposition of these forms is interesting since his is the first attempt at a systematic arrangement of all the known genera of Gramineae into divisions and subdivisions. His confidence in the enduring excellence of his Méthode, however much the rest of the Essai might fall short of perfection, is also interesting.§ He places these forms in "Familia II. Polythalama. Locustae dissimiles;" "Tribus quarta, axis integer. Glumae alternatim insertae," [as distinguished from tribe III *Tripsacum*, etc.]. *Olyra* comes under "Cohors Octava. Axes androgyni" with *Zizania* and *Pharus*, while *Lithachne* comes under "Cohors Nona. Axes monoici aut dioici. Sectio Prima. Axes monoici"

* Notes on *Paniceae* I appeared in Proc. Biol. Soc. Wash. 19: 183-192. Dec. 1906; Notes on *Paniceae* II op. cit. 21: 1-10. Jan. 1908.

† The text figures in the present paper are all magnified 5 diameters only, as most of the fruits in this group are unusually large.

‡ Agros. tab. meth. and pp. 124, 135, 137; 1812.

§ Les changements qu'on pourra y faire par la suite, pourront porter sur quelques details, sur des reunions ou des separations de genres; mais je ne pense pas qu'ils puissent attaquer en rien les bases et les principes de la Méthode. Les genres y sont tous distingues par des caracteres certains, constants et facile a saisir." Op. cit. Avertissement.

together with *Hydrochloa*, *Zea* and *Coix*, while *Spinifex* comes in "Sectio secunda. Axes dioici" with *Gynerium*.

Humboldt, Bonpland and Kunth (1815, Nov. Gen. 1:196) propose a "Section IX Olyraceæ" which includes *Pharus*, *Olyra* and *Luziola*. [*Panicææ* is their Section I.] Kunth (1815, Mem. Mus. Hist. Nat. 2:75) proposes a group "Gramina Olyrea" which includes *Zizania*, *Luziola*, *Hydrochloa*, *Pharus*, *Olyra*, *Zea*, and *Coix*.

Trinius (1826, Gram. Pan. 53, 55, 247, 249), places *Olyra* and *Milium amphicarpon* in his "Paniceorum Genera."

Nees (1829, Agros. Bras. 298) establishes "Familia Secunda. Gramineæ Olyreæ" for *Strepium*, *Caryochloa*, *Luziola*, *Pharus*, *Olyra* and *Coix* (Family I is *Panicææ*).

Kunth (1833, Enum. Pl. 67-70, 174) places *Amphicarpum*, *Olyreæ* and *Spinifex* in "III Paniceæ" which is very nearly the tribe *Panicææ* as recognized to-day, and subsequent authors generally have followed this disposition of these forms, though often associating *Pharus* and allied genera with them under *Panicææ*.

Though the *Olyrae* and *Spinifex* depart rather widely from the *Panicum* type, their affinities are clearly with this tribe. *Lithachne* Beauv. forms the only known exception to the tribal character of fruit dorsally compressed or subcompressed.

OLYREAE: Plants monoecious; blades flat, abruptly narrowed into a petiole-like base, convolute in the bud, the consequent creases persistent in the mature blade. First glume wanting in the pistillate spikelets, both glumes and sterile lemma wanting in the staminate spikelets.

KEY.

- | | |
|--|------------------|
| Inflorescence borne on leafy culms; fruit bony-indurated: | |
| Panicles terminal on culms or leafy branches, pistillate spikelets above, staminate spikelets below, in same panicle | <i>Olyra</i> |
| Panicles all axillary or axillary and terminal; the terminal when present wholly staminate: | |
| Fruit laterally compressed, conspicuously gibbous on upper dorsum | <i>Lithachne</i> |
| Fruit dorsally compressed, lanceolate | <i>Raddia</i> |
| Inflorescence consisting of 2 slender racemes, one staminate, the other pistillate, digitate at the summit of a naked culm; leafy stems distinct from base; fruit scarcely indurated | |
| | <i>Mniochloa</i> |

GENUS OLYRA L. MAY, JUNE, 1759, SYST. NAT. ED. 10. 1261.

"Masc. Cal. Gluma uniflora, aristata, Cor. Gluma mutica.

"Fem. Cal. Gluma uniflora, patula, ovata. Stylus 2-fidus. Sem. cartilagineum.

"*latifolia* A. Olyra. Sloan. jam. t. 64. f. 2."

The figure referred to in Sloane represents the upper portion of a culm with three leaves and a short exserted panicle, large spikelets on clavate pedicels at the ends of the branches and small spikelets along the same branches from the base. The polynomial given is "Gramen panicum majus, spica simpliciter laevi, granis petiolis insidentibus."

The type, from which the figure was made, is in the Sloane herbarium. The specimen in the Linnaean herbarium, from Jamaica, marked "Br" [Browne] agrees with the Sloane specimen. In Pugill. Jam. Pl. 408. Dec. 1759, Linnaeus gives a description of the species *O. latifolia*.

Mapira Adans. 1763, Fam. 2: 39.

"Couronne de la gaine des feuilles: Membrane courte. Fleurs: Panicule & épi. Calice: 1 fleur, 2 bales & 1 arête. Corolle: 2 bales."

In the "table" or index, page 574, under "Mapira Adans 39" is cited "Gramen. Sloan. t. 64. f. 2. Olyra. Lin." This is the figure upon which Linnaeus bases *Olyra latifolia*.

Description.—Spikelets unisexual, unlike in appearance, the staminate and pistillate together in panicles terminating the culm or leafy branches, the pistillate spikelets on clavate pedicels on the upper panicle branches

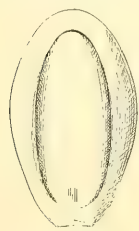


Fig. 1.

Olyra latifolia.

or at the ends of the branches, the staminate spikelets on slender pedicels or sessile on the lower branches or on the lower part of the pistillate branches; pistillate spikelets ovate-lanceolate, usually setaceous pointed, first glume wanting, second glume and sterile lemma membranaceous, nerved, acuminate-setaceous (or long-acuminate only in *O. longifolia* H. B. K.), the glume longer pointed than the lemma; fruit elliptic, lemma and palea thick, bony-indurated at maturity, the margins of the lemma scarcely inrolled; grain dorsally subcompressed, enclosed in the lemma and palea; staminate spikelets readily deciduous,

much smaller than the pistillate, narrowly lanceolate, glumes and sterile lemma wanting, lemma and palea thin membranaceous, the lemma 3-, the palea 2-nerved. Woody, bamboo-like perennials with ample blades abruptly narrowed into petiole-like bases, convolute in the bud before expanding, the consequent creases permanent and conspicuous in the mature blades. Species about twenty, confined to the tropics and subtropics of America except a form of *O. latifolia* L. or a close ally which is found in South Africa, and a form distantly related to *O. micrantha* H. B. K. in the Fiji Islands.

The known species fall into three rather well-marked groups.

1. *Panicle branches with elliptical or lanceolate, setaceous-pointed, pistillate spikelets above, staminate spikelets below; glumes glabrous or nearly so.*

* *Fruit smooth and shining, not pitted.*

OLYRA LATIFOLIA L., CAPILLATA Trin., CAUDATA Trin., CORDIFOLIA H. B. K., PUBESCENS Radd., SCABRA Nees.

** *Fruit not pitted, clothed with thick silky hairs at base and summit, on margins or back.*

OLYRA GLABERRIMA Radd., CILIATIFOLIA Radd., SEMIOVATA Trin., and the following:

Olyra yucatanæ

Panicles contracted, often a second one from the upper sheath, 8–15 cm. long, 2 cm. wide, axis and rachis scabrous; staminate spikelets on the lower branches and lower part of upper pistillate branches, 8 mm. long including the setaceous tip of the lemma, palea about 2 mm. shorter; pistillate spikelets 15 to 17 mm. long, the glume and sterile lemma scabrous, 7-nerved, 8 mm. long, and acuminate into flexuous setaceous tips as long again in the glume, half as long in the sterile lemma; fruit elliptical, obscurely pointed, 7 mm. long, 4 mm. wide, white and shining or old ivory toward maturity, the lemma silky-pubescent at base and on the margins. Culms tall, slender; sheaths mostly longer than the internodes, crisp-puberulent, blades 13 to 16 cm. long, one-third as wide, abruptly acuminate at the apex, trapezoid-truncate at base. Known only from Yucatan.

This species was described and figured by Millspaugh & Chase (1903, Field Col. Mus. Bot. 3: 46) under the name *Olyra semiovata* Trin. The examination of Trinius' type has shown this disposition of the Yucatan form to be erroneous. Type *Gaumer* 2372, No. 125941 Herb. Field Columbian Museum. "Common at Chichankanab, *Gaumer* 1389, Pocoboch, *Gaumer* 2372."

*** *Fruits pitted.*

OLYRA FASCICULATA Trin., FILIFORMIS Trin., HELICONIA Lindm. (Pl. Boliviana, a Miguel Bang lectae no. 508, distributed as *O. latifolia* belongs to the latter species.)

2. *Upper panicle branches with globose, hispid-bristly, setaceous-pointed, pistillate spikelets only; lower branches with staminate spikelets only; fruit pitted.*

OLYRA MICRANTHA H. B. K., HIRSUTA Trin., VENTRICOSA Nees. A specimen from "Feejee Islands, Sandalwood Bay" collected on the Wilkes expedition 1838–42 belongs in this group.

3. *Upper panicle branches with oval pistillate spikelets, not pointed, fruit smooth.*

OLYRA RAMOSISSIMA Trin., PANICUM LATERALE Presl and probably *O. SARMENTOSA* Doell, form a third group with unpointed pistillate spikelets on pedicels scarcely clavate, glabrous and unpitted fruit; slender-stemmed freely branching plants with blades and panicles scarcely exceeding 5 cm. long.

In *O. ramosissima* the staminate spikelets are villous and only on the lower branches of the panicles. Our specimens of *P. laterale* Presl (Pittier 3641, 11008, 12058) are destitute of staminate spikelets, but the pistillate spikelets with the first glume wanting, bony-indurated fruit and no stamens, as well as the firm blades abruptly narrowed into a petiole-like base unmistakably place this species in *Olyra*.

Olyra laterale (Presl).

Panicum laterale Presl 1830. Rel. Haenk. 1 : 305. "Hab. in Peruviae montanis huanoccensibus." The type, in the Presl herbarium in the National Museum at Prag, is labeled "*Panicum laterale* nov. sp. J. S. Presl" and "Peruano montano oronoccensis." No staminate spikelets are present, the first glume is wanting in the pistillate spikelets, though Presl's description reads: "gluma inferiore brevissima," and again "Gluma inferior minima vix ulla." Judging from the description *O. sarmentosa* Doell is this species or closely allied to it.

GENUS LITHACHNE Beauv. 1812, Agros. 135, t. 24, f. 11.

"De λῆθος, Lapis; ἄχρη, Palea.

"Culmus ramosus: Axes spicati: Spicae simplices, dissimiles; alia terminali, Locustis 1-floris, masculis.—Glumae nullae.—Paleae acutissimae.—Stamina 6; aliis axillaribus, Locustis 1-floris, semineis.—Glumae herbaceae, acutissimae.—Paleae coriaceo-induratae: infer. truncata, navicularis, gibba. * * * Spec. *Olyra pauciflora* Lin." [error for Swartz, in the index (p. 168) "*Olyra pauciflora* Sw. Vid. *Lithachne* 135" is given.]

Beauvois' statement that there are six stamens is an error, due probably to mistaking the separated cells for entire anthers.

Though the genus is based on *O. pauciflora* Sw. Beauvois does not transfer this name to his new genus; in the index (p. 166) the only species given under *Lithachne* is *axillaris* without reference as to what this name is based on. In the explanation of plate 24 the name *Lithachne axillaris* is used. *Olyra axillaris* Lam. 1797 Encyc. 4 : 547 (see below), is the same species as *O. pauciflora* Sw. and Lamarck cites the latter name as a synonym under his own *O. axillaris* though published some years earlier. Beauvois does not cite Lamarck's work though he must have been acquainted with it and his *L. axillaris* is doubtless based on Lamarck's *O. axillaris*.

Olyra pauciflora Sw. 1788, Prod. 21. "Jamaica." The type labeled "*Olyra pauciflora* Sw. fl. ind. occid. Jamaica Sw." is in the Swartz herbarium at Stockholm.

Trinius (1820, Fund. Agros. 200) includes *Lithachne* under *Olyra*, "panicled, or spikelets axillary" covering both in the diagnosis; the gibbous pistillate floret is not mentioned. In 1826 (Gram. Pan. 251) Trinius makes the same disposition of *Lithachne*; the gibbous character of the floret being mentioned as: "perianthio semiovato, truncato."

Poiret (1823, Dict. Sci. Nat. 27:60.) with the spelling "*Lithacne*" gives a brief description of the genus and species, transferring *O. pauciflora* Sw. to this genus, but giving Beauvois as author of the combination.

Sprengel (1825, Syst. 1: 238.) includes *O. pauciflora* Sw. in *Olyra* giving *Lithachne* as synonym.

Nees (1829, Agros. Bras. 309) in a note after *Olyra floribunda* Radd. says that this species, which he inserts on the authority of Raddi not having seen it, is to be referred to *Lithachne* Beauv. with *Olyra pauciflora* Sw. The latter is not included in his *Agrostologia Brasiliensis*.

Kunth (1829, Rev. Gram. 1: 29 and 1833, Enum. 1: 68) places *O. pauciflora* Sw. in *Olyra* without mentioning the gibbous floret in either the generic or specific description, though the axillary panicles are noted. *Strephium* Schrad. is given generic rank in the Enumeratio (p. 70) emphasis being given to "Culmi caespitosi. Folia disticha. Racemi axillares, pauciflori" which would apply as well to *O. pauciflora* Sw.

Trinius (1835, Pan. Gen. 30)* places *O. pauciflora* Sw. together with *O. floribunda* Radd. and *O. polypodioides* Trin. in *Olyra* under "b) Spiculæ femineæ in racemis propriis, inferis vel paniculæ masculæ subjectis (Lithachne P. B.)." The gibbous fruit of *O. pauciflora* is noted.

Steudel (1854, Syn. Pl. Glum. 1: 37) includes *Olyra pauciflora* Sw. as well as *O. floribunda* Radd. and *O. polypodioides* Trin. in *Olyra*, copying Trinius' synoptical heading given above. The gibbous floret of *O. pauciflora* Sw. is not mentioned.

Grisebach (1864, Fl. Brit. W. Ind. 536) includes *O. pauciflora* Sw. under *Olyra*; the pistillate "flower obversely deltoid," is mentioned. In 1866 (Cat. Pl. Cub. 229) Grisebach makes the same disposition of it and includes *O. pineti* Wright and *O. strephioides* Griseb. also.

Fournier (1876, Bull. Soc. Bot. Belg. 15: 464, 465) in a paper "Sur les Graminées mexicaines à sexes séparés," distinguishes between *Olyra*, *Lithachne* and *Strephium* but makes some errors in detail. Of *Lithachne* he says the male spikelets are superior and the female inferior which serves to distinguish it from *Olyra*; and again, that *Lithachne axillaris* Beauv. (*O. pauciflora* Sw.) establishes a transition from *Lithachne* to *Strephium*, that the inferior axillary branches are reduced to a single flower, but these [pistillate spikelets] still form part of the same terminal panicle as the males, that this species further differs from *Strephium* in the bellied or swollen female floret. Of *Strephium* he says that the male and female spikelets are in different inflorescences. But some of these distinctions do not hold good in all cases and some are wholly in error. In *O. pauciflora* the axillary panicles bear one to several staminate spikelets below the terminal pistillate one; again we find no specimens in which pistillate spikelets are truly in the terminal panicle, but they sometimes appear to be so since the upper blades are crowded at the summit of the culm and their respective axillary inflorescences overlap the terminal one, which, so far as our specimens show, is entirely staminate when present, but it is often wanting. As for *Strephium* while the staminate and pistillate spikelets are almost constantly in distinct racemes we find staminate spikelets (or their characteristic slender pedicels as distinguished from the clavate pedicels of the pistillate spikelets) below the pistillate spikelets in the

* Mem. Acad. Petersb. Ser. VI, 3: 2118. 1835.

narrow axillary panicles of a Liebmann specimen of *S. strictiflorum* Fourn. cited by Fournier in his original description.

Doell (1877 in Mart. Fl. Bras. 2: 2 315) includes all these forms in *Olyra*, dividing the genus into "I. Aerandrogynæ. Panicula terminalis, nonnunquam cum una alterave panicula accessoria laterali. Spiculæ utrisque sexus in eadem panicula, femineæ pauciores." [It should be noted that the lateral panicles of this group are terminal on leafy branches not axillary as in II and III.] This includes *O. latifolia* L. and fourteen other species several of which we have not seen, but all (except *O. sympodica* Doell) apparently coming within the genus *Olyra* as limited above. "II Pleurandrogynæ. Paniculæ laterales, basi masculæ, apice femineæ (suprema rarius terminalis et mere mascula.)" This includes *O. flaccida* Doell, which we have not seen, and *O. pauciflora* Sw. "III. Heterogenicæ. Paniculæ sexu distinctæ, monocæ, inferiores mere femineæ, nonnunquam ad spiculam unicam redactæ, superiores masculæ. Panicula terminalis, ubi adest et ipsa mascula." A footnote is added here saying that these characters are those of the genus *Strepium* which in his opinion has too little to distinguish it. Under this division are *O. polypodioides* Trin., *O. floribunda* Radd., and *O. nana* Doell; *O. pineti* Wright is added at the end with the observation that this Cuban species also belongs in this section of the genus. In the description of the latter the gibbous pistillate floret is noted.

Fournier (1881, Mex. Pl. 2: 4) recognizes both *Lithachne* and *Strepium* as genera, but he gives no generic description and the key is inaccurate as regards position of pistillate spikelets in the latter two. (See above under Fournier, 1876.) *Lithachne* and *Strepium* are divided on the gibbous floret of the first and linear-elliptic floret of the second.

Bentham & Hooker (1883, Gen. Pl. 3: 1110) include all these forms in *Olyra*, remarking that *Lithachne*, *Strepium* and *Raddia* form a section with axillary few-flowered pistillate or androgynous panicles.

Hemsley (1885, Biol. Cent. Am. 3: 510) includes all under *Olyra*, transferring Fournier's *Strepium strictiflorum* to *Olyra*.

Hackel (1887, Engler & Prantl, Pfl. Fam. 2: 239) includes *Lithachne*, *Strepium* and *Raddia* as synonyms under *Olyra* without subdivisions or sections.

Description.—Spikelets unisexual, unlike in appearance; inflorescence consisting of few to several small panicles or racemes, solitary or in fascicles of two to four or five, short-exserted from the sheaths, each bearing one pistillate spikelet on a clavate pedicel at the summit, and one to several staminate spikelets on slender pedicels, below; a narrow short-exserted terminal, wholly staminate panicle often present, rarely a fascicle of 2 or 3 such panicles; pistillate spikelets V-shaped owing to the greatly swollen fertile lemma; first glume wanting; second glume and sterile lemma membranaceous, nerved, unequal, long-acuminate; fruit laterally subcompressed (forming an exception to the tribe character of dorsally compressed fruit in *Panicææ*), lemma and palea thick bony-indurated, the lemma greatly



Fig. 2.
Lithachne
pauciflora.

swollen or gibbous on the back, so as to appear in side view half obcordate-truncate, the margins inrolled over a narrow palea; grain laterally sub-compressed, inclosed in the lemma and palea. Staminate spikelets narrowly lanceolate, reduced to the thin-membranaceous lemma and palea and 3 stamens. Caespitose, herbaceous, perennials with simple culms and blades contracted at base and convolute in the bud as in *Olyra*. Only two species known to us (*O. flaccida* Doell may belong here), confined to the tropics and subtropics of America.

While neither the laterally-compressed gibbous fruit nor the axillary inflorescence alone would afford sufficient reason for recognizing *Lithachne* as a genus, these being combined and constant, together with a habit distinct from that of *Olyra*, and the fact that there are no intermediate species (so far as known), seem to make generic rank the more natural disposition of these forms.

LITHACHNE PAUCIFLORA (Sw.) Beauv.

Olyra pauciflora Sw. 1788, Prod. 21. (See above.)

Olyra axillaris Lam. 1797. Encyc. 4: 547. "a Caienne * * * Richard (V. s)" "Lam. illust. t. 751 f. 2," is cited. The published date of the part in which this plate occurs is 1823, but according to Sherborn and Woodward * plates 1-100 were published in 1791; 700 in 1797; 901-950 in 1819. Evidently some of the plates were printed some time before they were issued. We have not seen the type but the plate referred to above is unmistakable.

Lithachne axillaris Beauv. 1812, Agros. 166 t. 24, f. 11. No type indicated, presumably based on *Olyra axillaris* Lam.

Lithachne pauciflora Beauv.; 1823, Poir. Dict. Sci. Nat. 27: 60. Two varieties of this species have been described by Kuntze (Rev. Gen. 3: 2357) from Bolivia.

***Lithachne pineti* (Wright).**

Olyra pineti Wright 1862; Griseb. Mem. Acad. Amer. Sci. Art. 8: 532. "Prope Monte Verde, inter pinorum folia dejecta 1536" [Wright, Cuba]. The type is in the Grisebach herbarium; a duplicate in the Gray herbarium is a tuft of numerous very slender culms. Besides the label the latter sheet bears a slip in Wright's hand "*Olyra Pineti*. Growing among masses of fallen pine leaves near Mr. Prevals, M. V., [Monte Verde] Aug. 22."

A delicate species apparently known only from the Wright collection.

GENUS *RADDIA* Bertol. 1819, Bologn. Opusc. Sc. 3: 410.

"Flores masculi in racemis distinctis, superioribus. Calyx uniflorus, biglumis, glumis acuminatis, muticis. Corolla nulla. Filamenta brevissima. Antherae lineares longae.

"Flores foeminei in spicis distinctis, inferioribus. Calyx uniflorus biglumis, patens, gluma altera longiore, aristata. Corolla biglumis, mutica, stylus simplicissimus."

* Ann. Mag. Nat. Hist. 17: 582, 1906.

But one species is given:

"*Raddia Brasiliensis*."

"Habitat in provincia di Rio Janeiro Brasiliae, v. s."

The specimen was collected by Raddi since Bertoloni states that the specific name will commemorate the courageous voyage to Brazil of Raddi to whom the genus is dedicated. The author remarks that this genus serves to unite *Coix* with *Olyra*.

The whereabouts of Bertoloni's type, if it be in existence, is not known. In the Trinius herbarium is a specimen from Bahia, Brazil, collected by Riedel, labeled *Olyra floribunda* Raddi by Trinius, and the original of plate 345 in the *Icones* which agrees well with Bertoloni's description.

Raddi (1823, Agros. Bras. 20) redescribes what is evidently a specimen from the same collection under the name "*Olyra floribunda* * * * nob" and gives *Raddia brasiliensis* Bert. as a synonym. "Reperitur ad radicem Montis Corcovado, nec alibi." [Mt. Corcovado is some three miles southwest of Rio Janeiro.] Raddi's type has not been examined. Nees says that nothing but the description remains, but search among Raddi's Brazilian collections in the herbarium of the botanical garden of Pisa may bring it to light. The two descriptions apply so well to Trinius' specimen that there is no doubt that this species was correctly interpreted by Trinius.

Sprengel (1827, Syst. 4: Cur. Post. 29) transfers *R. brasiliensis* Bertol. to *Olyra* without comment.

Nees (1829, Agros. Bras. 309) includes *O. floribunda* in *Olyra* with the following observation: "De hac specie, ad Lithachnas, Pal. de Beauv., cum *Olyra pauciflora* Sw. referenda, praeter verba Raddiana nihil superest, quod ad feramus." The description states that the pistillate spikelets are in distinct axillary racemes, but does not mention the form of the floret.

Strephium Schrad. 1829, in Nees Agros. Bras. 298.

"Spiculae uniflorae, muticae; masculae et foeminae in distinctis racemis ejusdem plantae. Spiculae masculae: calycis glumae duae, linearilanceolatae; inferior acuminata; corollinae valvulae nullae. Foeminae spiculae: calycinae glumae duae, ovato-lanceolatae, acuminatae; valvulae totidem, cartilagineae. * * * Inflorescentia: Racemi, axillares, pauciflori. Culmi caespitosi, foliis subdistichis."

"Observ. Genus hocce *Olyrae* proximum, sed diversum foliatione, spicularum dispositione axillari, floribus masculis superius positis atque glumarum structura et proportione. Schrad."

This is based on a single species, *Strephium distichophyllum* "Schrad. ined." We have not seen the type of this, but the description applies so well to *Olyra polypodioides* Trin. that it must be a close ally of that species (the type of which, also from Bahia, Brazil, was examined in the Trinius herbarium at the St. Petersburg Academy of Sciences), as stated by Trinius (1835, Mem. Acad. Petersb. Ser. VI, 3: 117). Nees' description of *Olyra floribunda* Raddi (l. c.) would place this species in *Strephium* instead of in *Olyra*, but he had not seen *O. floribunda* and possibly Schrader's genus and species were inserted on Schrader's authority only without

having been seen by Nees. Trinius' specimen of *O. floribunda* is closely related to *Strepium strictiflorum* Fourn., though much smaller in all its parts, but these are closely congeneric with *O. polypodioides*. This is well brought out in the detailed drawings of *O. polypodioides* and *O. floribunda* in plate 45, Doell in Mart. Fl. Bras. vol. 2, pt. 2.

Kunth (1833, Enum. 1:70) recognizes *Strepium* as a genus (see note under *Lithachne*.)

Trinius (1835, Pan. Gen. 29)* places *O. floribunda* Radd. and a new species, *O. polypodioides* Trin. in *Olyra* (see note above under *Lithachne*) and in the Icones (1836, pl. 345) the former is figured.

Steudel (1854, Syn. Pl. Glum. 1:36) includes these forms in *Olyra* (see note above under *Lithachne*).

Wright (1871, Anal. Acad. Cien. Habana 8:202; 1873, Sauv. Fl. Cub. 193) transfers *Digitaria pulchella* Griseb. to *Strepium* with the mark of doubt.

For the disposition of these forms by Fournier (1876, Bull. Soc. Bot. Belg. 15:465; and 1881, Mex. Pl. 2:4); Doell (1877, Mart. Fl. Bras. 2:2315); Bentham & Hooker (1883, Gen. Pl. 3:1110); Hemsley (1885, Biol. Cent. Am. 3:510), and Hackel (1887, Engler & Prantl, Pfl. Fam. 2:239) see notes above under *Lithachne*.

Description.—Spikelets unisexual, unlike in appearance; the staminate and pistillate in distinct small panicles, the staminate terminal or from the upper nodes; the pistillate axillary, short-exserted, few-flowered, usually from the lower nodes (a few staminate spikelets sometimes borne below the pistillate spikelets in *Strepium strictiflorum*); pistillate spikelets lanceolate, first glume wanting, second glume and sterile lemma membranaceous, strongly nerved, subequal, acuminate; fruit dorsally subcompressed, lanceolate, acute; lemma and palea bony-indurated but less so than in *Olyra* and *Lithachne*, the margins flat, nearly meeting over the palea.



Fig. 3.
Raddia
polypodioides.

Staminate spikelets linear-lanceolate. Low caespitose herbaceous perennials with simple culms and blades narrowed at the base, the creases indistinct, usually conspicuously distichous and turned with the surfaces on a single plane. Five known species, natives of the tropics and subtropics of America.

RADDIA BRASILIENSIS Bertol. 1819, Bologn. Opusc. Sc. 3:410.

Olyra floribunda Radd. 1823, Agros. Bras. (See above.)

Olyra brasiliensis Spreng. 1827, Syst. 4: Cur. Post. 29, based on *Raddia brasiliensis* Bertol.

Strepium floribundum Nees 1854; Steud. Syn. Pl. Glum. 1:36, based on *Olyra floribunda* Radd.

***Raddia distichophylla* (Schrad.).**

Strepium distichophyllum Schrad. 1829, in Nees Agros. Bras. 298.
"Habitat in sylvis primævis, prov. Bahiensis ad viam Felisberti alibique."

* Mem. Acad. Petersb. Ser. VI, 3:217.

Raddia polypodioides (Trin.).

Olyra polypodioides Trin. 1835, Mem. Acad. Petersb. Ser. VI. 3 : 2117.
 "V spp. Bahiens."

Raddia strictiflora (Fourn.).

= *Cryptochloa strictiflora* (Fourn.) Swallen

Strephium strictiflorum Fourn. 1876, Bull. Soc. Bot. Belg. 15 : 465.
 "Arroyo Sello (Karw. [insky] n. 1473 in herb. Petropolitano)."

Olyra strictiflora Hemsl. 1885, Biol. Cent. Am. Bot. 3 : 510; based on the preceding.

Raddia nana (Doell).

= *Raddiella nana* (Doell) Swallen

Olyra nana Doell 1877, in Mart. Fl. Bras. 2 : 329. "Ad Ega prov. do alto amazonas (Martius)." The type is in the herbarium of the Botanisches Museum at Munich.

Raddia concinna (Hook. f.).

= *Cryptochloa concinna* (Hook. f.) Swallen

Olyra concinna Hook f. 1896, Bot. Mag. III, 52 : t. 7469. "*O. concinna* arrived at the Royal Gardens, Kew, in 1891 * * * sent by Mr. C. Winkle, from San Jose in Costa Rica. It flowered in January, 1895."

*Raddia
sympodica*
W Hitchc

Olyra sympodica Doell, 1877 in Mart. Fl. Bras. 2 : 322 probably belongs in this group as suggested by Doell (op. cit. p. 329). It seems likely that the "sympodium" he describes is not truly a sympodium but that the culms simulate this habit by a twisting of the internodes, as not infrequently occurs in this genus and in *Lithachne*.

GENUS MNIOCHLOA GEN. NOV.

Inflorescentia monoica, racemis binis tenuibus spiciformibus, alter staminato alter pistillato, summo apici culmi nudi insidentibus constans. Spiculæ pistillatæ 1-floræ, oblongo-lanceolatæ dorsaliter compressæ, solitariis brevissime clavellato-pedicellatæ, secus rhachim triangularem tenuem unilateraliter dispositæ; gluma prima nulla, gluma secunda lemmati sterili æquans, setis nullis; lemma fertile albo cartilaginiter subindurato, marginibus planis, paleam similem amplectens; caryopsis dorsaliter compressa; staminum rudimentis nullis. Spiculæ staminatæ pistillatis breviores, glumis lemmatique sterili nullis; lemmati paleaque membranaceis; lemmati 1-nervo, palea 2-nervo, staminibus 3. Gramina perennia humilia caespitosa. Culmi fertiles 1-3-nodi, vaginis brevibus laminis carentibus instructi. Culmi steriles crebre, et plerumque duplici ordine foliosi; laminis planis, 2 cm. longis aut minoribus, ovato-lanceolatis, basi abrupte contractis et quasi brevi petiolatis. Trabit nomen a *μύρον* musco et *χλόα* gramine pro stirpium sterilium similitudine *Mnii* generis cuiusdam musci.

Typus.—*Digitaria pulchella* Griseb.

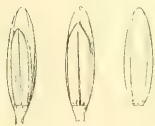


Fig. 4.

Mniochloa pulchella.

Inflorescence monoecious consisting of two slender spike-like racemes, one pistillate the other staminate, at the summit of a slender naked culm; pistillate spikelets dorsally compressed, 1-flowered, lanceolate-oblong, solitary on very short clavate pedicels along one side of a slender triangular rachis; first glume wanting, second glume and sterile lemma subequal, not setaceous; fertile lemma white-cartilaginous subindurated, the margins flat, enfolding a palea of like texture and equal length; grain dorsally compressed; staminate spikelets smaller than the pistillate, glumes and sterile lemma wanting, lemma and palea membranaceous, equal, the lemma 1-nerved, palea 2-nerved; stamens 3. Low tufted perennials; the flowering culms with 1 to 3 nodes, the short sheaths destitute of blades, distinct from the sterile stems which bear several to many more or less distichous, flat, ovate-lanceolate, blades, less than 2 cm. long, narrowed into a petiole-like base. Name from *μυλον* moss and *χλόα* grass, from the resemblance of the sterile stems to *Mnium* a genus of mosses. But two species known, both from Cuba.

Type.—*Digitaria pulchella* Griseb.

***Mniochloa pulchella* (Griseb.).**

Digitaria pulchella Griseb. 1866, Cat. Pl. Cub. 231. "Cuba or. (Wr[ight] 3448). E[ndemic]." The type in the Grisebach herbarium at Göttingen was examined by Prof. A. S. Hitchcock.

Strepthium? pulchellum Wright 1871, Anal. Acad. Cien. Habana 8 : 202; Sauv. Fl. Cub. 193. 1873. "[3448.] *Digitaria pulchella* Gris. Crece al borde de precipicios en el Yunque de Baracoa."

A description follows giving the monoecious character of the inflorescence, a point which seems to have escaped Grisebach's notice.

A delicate species, flowering culms filiform, 15 to 25 cm. high, nodes 2 or 3, at least the lower geniculate, the upper internode and peduncle elongated, sheaths slightly inflated, 1 to 3 cm.-long, racemes erect or ascending 2 to 3.5 cm. long, the staminate slightly shorter than the pistillate; pistillate spikelets glabrous, 2.5 mm. long; glume and sterile lemma about one-fourth shorter than the glabrous fruit; staminate spikelets 1.5 mm. long, glabrous. Sterile stems spreading or prostrate, the distichous leaves approximate, the sheaths, at least the upper overlapping, ciliate on the margin and at the summit, blades firm, 8 to 18 mm. long, 3 to 5 mm. wide, subacute, sparsely hairy along the mid-nerve, pale green above, dark purplish beneath, undulate on the margins. Known from a single collection, *Wright* 3448. In addition to the type, specimens of this number have been examined in the Gray herbarium and in the Sauvalle herbarium in the Estacion Agronomica, Santiago de las Vegas, Cuba. The specimen in the Gray herbarium has five flowering culms from the single small tuft. On the sheet is a slip in Wright's hand "Gram. near *Olyra* * * not *Digitaria*, *nov.* *Panicum*."

***Mniochloa strephioides* (Griseb.).**

Olyra strephioides Griseb. 1866, Cat. Pl. Cub. 229. "Cuba occ. (Wr[ight] 3435)." Type in the Grisebach herbarium at Göttingen.



Mniöchloa pulchella (Griseb.) Chase.

Plant, natural size. Staminate spikelet, two views of pistillate spikelet and fruit magnified 10 diameters.

Grisebach's description is inaccurate in regard to the inflorescence, which he describes as staminate and pistillate mixed, terminal pistillate. The staminate and pistillate racemes are distinct in the type as in the other specimens seen, but the two lie so closely together that they might be mistaken for one unless examined carefully.

Flowering culms slender 4 to 7 cm. high, equaling or shorter than the sterile stems, the inflorescence short-exserted, the racemes erect, 1 to 3 cm. long, about equal; pistillate spikelets 3.5 mm. long, the glume and sterile lemma glabrous, exceeding the fruit which is entirely clothed with white silky hairs; staminate spikelets scarcely one-half as long as the pistillate, glabrous. The sterile stems less delicate than in the preceding, blades firmer, pale green, triangular ovate, minutely pubescent on both surfaces, ciliate on the margins. Besides the type, specimens of *Wright* 3435 have been examined in the National Herbarium, Gray herbarium, herbarium of Columbia University, and in the Sauvalle herbarium. This species was collected by Caldwell and Baker (no. 7011) at San Diego de los Banos, Cuba, the only known collection since Wright's.

GENUS AMPHICARPON, Raf. Jan. 1818, Am. Month. Mag. 2 : 175.

"His [Pursh's] *Milium amphicarpon* must probably form a new genus *Amphicarpon* Raf." The foregoing occurs in Rafinesque's review of Pursh's *Flora of North America*. No generic characters are given and it is evident Rafinesque had not seen the species upon which he bases his genus, but technically the above constitutes publication.

Milium amphicarpon Pursh 1814, Fl. 1 : 62. pl. 2. "New Jersey near Egg-Harbour." The plate represents a specimen with a narrow terminal panicle and numerous large spikelets on slender branches from the base of the culm. The type is in the herbarium at Kew. The name "*Milium Amphicarpon*" and "Herb. Pursh propr" are written on the sheet, and on the back is written "N. America, Fred. Pursh."

Pursh gives a good description of "this singular grass" but his statement: "Flores feminei in scapis radicalibus unifloris basi vaginatis," is inaccurate in that these spikelets are perfect and cleistogamous.

Amphicarpon Kunth 1829, Rev. Gram. 1 : 28.

"Spiculæ bifloræ (flore inferiore unipaleaceo, neutro glumæ similimo), masculæ et femineæ in eadem planta; hæ radicales, longè pedunculatæ; illæ terminales, paniculatæ.

"Masc. : Gluma unica (altera inferior nulla), membranacea, concava, mutica. Paleæ floris masculi duæ, longitudine glumæ, subæquales, chartaceæ, concavæ, muticæ; inferior superiorem binerviâ amplectens. * * * Stamina tria. Ovarium effêtum. Fem: Gluma unica, membranacea, multinerveâ, concava, mutica, paleis vix brevior. Paleæ floris feminei duæ coriaceæ, acutatæ; inferior superiorem binerviâ amplectens. * * * Stamina effeta. Ovarium glabrum. Stigmata duo, terminalia, sub-sessilia, plumosa; * * * Caryopsis oblonga, teretiuscula, glabra, libera, paleis inclusa. Gramen caespitosum. * * * Panicula ramis simplicibus; spiculis pedicellatis, racemosis, cum pedicello con-

tinuis. Pedunculi seminei fasciculati, uniflori, vaginati; fructiferi subterranei."

But one species is given:

"*Amphicarpum Purshii*. (*Milium amphicarpum* Pursh. * * *)"

Although Kunth bestows upon this genus the same name as did Rafinesque, it does not appear that he knew of the latter's proposed genus.

Like Pursh in the original description of this species, Kunth errs in saying that the subterranean spikelets are pistillate only, and in this is followed by Steudel (1854, Syn. Pl. Glum. 1 : 35) and Bentham & Hooker, (1883, Gen. Pl. 3 : 1099). Trinius (1821, in Sprengel Neu. Entd., 2 : 50) points out Pursh's error, stating that the paniculate spikelets are perfect, describing their styles and stigmas; and while apparently not finding stamens in the subterranean spikelets he argues that these must be perfect since they mature their grains before the paniculate spikelets are in anthesis. This latter point does not hold good, however, for specimens are common wherein the two forms of spikelets are strictly contemporary. Gray (1848, Man. 609) gives the first completely accurate description of the genus, "Stamens 3 (small in the radical flowers)."

Description :—Spikelets of two kinds on the same plant, one in a terminal panicle, perfect but not fruitful, the other cleistogamous on slender leafless branches at the base of the culm and subterranean, sometimes also



Fig. 5.

*Amphicarpum
amphicarpon.*

from the lowest nodes; first glume of the aerial spikelets variable in size or obsolete, second and sterile lemma subequal; lemma and palea indurated, margins of lemma, thin, flat; fruiting spikelets much larger, first glume wanting, second glume and sterile lemma strongly nerved, subrigid, exceeded at maturity by the turgid, elliptic acuminate fruit with much indurated lemma and palea, the margins of the lemma thin, flat; stamens with small anthers on short filaments. Two species of the Atlantic coast plain of the United States.

AMPHICARPON AMPHICARPON (Pursh) Nash 1894, Mem. Torr. Cl. 5:352; based on *Milium amphicarpum* Pursh.

Besides the synonymy given above:

? *Milium ciliatum* Muhl. 1817. Gram. 77. "Habitat in Nova Caesarea." Kunth gives this as synonym under *A. Purshii*, and is followed by later authors, but no one states that he has seen the type.

AMPHICARPON FLORIDANUM Chapm. 1860, Fl. So. U. S. 572. "Banks of Apalachicola River, Florida."

Agrostis amphicarpon Poir. Encecl. Suppl.
5: 534. Based on "Pursh, Flor. amer.
1 pag. 62. tab. 2. In New Jersey."

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON GENERA OF PANICEAE. IV.*

BY AGNES CHASE.

The work upon the genera of *Paniceae* as originally outlined contemplated a consideration by groups. It was the intention of the writer to prepare as a final paper a synopsis of the entire work, in a sequence representing, so far as possible in a lineal series, the natural relationship of the genera investigated. This synopsis with special reference to American genera together with notes on the North American genera are offered in a preliminary way at this time at the request of Mr. G. V. Nash, of the New York Botanical Garden, who wishes to cite the references in his forthcoming treatment of the tribe *Paniceae* in the North American Flora.

PANICEÆ.

Spikelets ideally 2-flowered, the terminal floret perfect, the lower staminate or neuter (perfect in *Isachne* and *Dissochondrus*), its glume (the sterile lemma) unlike the flowering glume (the fertile lemma) in form and texture and simulating a third empty glume, a membranaceous or hyaline sterile palea (indurated at maturity in *Ixophorus* and in a few species of *Panicum*) present or wanting, the spikelet or at least the fruit (the fertile floret) dorsally compressed (laterally in *Lithachne*); fertile lemma and palea alike in texture, indurated, or at least firmer than the glumes and sterile lemma, firmly clasped together (open at the summit in *Leptocoryphium* and *Hymenachne*) inclosing the free grain (in the cultivated *Pennisetum americanum* the enlarged grain forcing open the lemma and palea), awnless (sometimes mucronate, acuminate-pointed or, in *Coridochloa*, *Alloteropsis*, and species of *Eriochloa*, even short-awned), the nerves obsolete (present in *Reimarochloa* and *Acritochaete*).

*Notes on Genera of Paniceae I appeared in Proc. Biol. Soc. Wash. 19 : 183-192. 1906; same II, op. cit. 21 : 1-10. 1908; same III, op. cit. 21 : 175-188. 1908.

In the following synopsis and diagnoses this ideal spikelet is always in mind, the same name being used for corresponding parts, even when the first glume is wanting as in most species of *Paspalum* or when both glumes are wanting as in *Reimarochloa* and in a few species of *Paspalum*, the scale which appears to be a glume in the latter case, being the sterile lemma.

The type species of each of the genera here recognized, except *Thrasya*, *Odontelytrum* and *Dissochondrus*, and of most of the generic names referred to synonymy, is represented in the National Herbarium by specimens or in a few cases by spikelets contributed from type specimens.

SYNOPTICAL KEY.

100 Spikelets all alike (the lower of each pair aborted in *Echinolaena*).

2 Spikelets neither sunken in the cavities of a spongy rachis, nor surrounded by an indurated leaf-sheath nor involucre-form bracts.

Spikelets not subtended nor surrounded by bristles (sterile branchlets), (axis of branchlet extending beyond the base of the uppermost spikelet as a point or bristle in *Panicum*, subgenus *Paurochaetium*).

Fruit cartilaginous-indurated, not rigid, papillose, usually dark colored, the lemma with more or less prominent, white hyaline margins not inrolled. (Fruit not rigid in *Hymenachne*, *Reimarochloa* and in a few species of other genera, but texture and margin not as above.)

Spikelets awnless.

Fruit open at hyaline summit 1. *Leptocoryphium*.

Fruit not open at summit.

Lemma boat-shaped, hyaline margins narrow

2. *Anthænantia*.

Lemma convex with broad hyaline margin.

Fruit lanceolate-acuminate; second glume and sterile

lemma ~~usually~~ long-silky 3. *Calamagrostis*

Fruit elliptic, pubescence short or none.

Inflorescence of slender racemes, digitately or sub-

digitately arranged 4. *Syntherisma*.

Inflorescence a capillary panicle 5. *Leptoloma*.

Spikelets with slender awns.

Second glume reduced to a minute scale; sterile lemma

with a straight awn 6. *Chloridion*.

Second glume and sterile lemma with flexuous or tangled

awns 7. *Acritochaete*.

Fruit indurated, rigid (or if thin, not hyaline-margined).

Alternate spikelets facing in opposite ways, that is the first

glume alternately extrorse and introrse; inflorescence

a solitary, unilateral raceme, the margins of the concave

rachis partially embracing the subsessile spike-

lets 8. *Thrasya*.

el

Trichachne
Digitaria

Alternate spikelets not facing in opposite ways (or if so the lower of the pair aborted).

Spikelets (or the primary one of a pair) placed with the back of the fruit turned away from the rachis, usually solitary.

First glume as long as the spikelet or nearly so.

Spikelets in pairs, the secondary usually aborted, sometimes wanting, strongly tuberculate-hispid or uncinatate at maturity, laterally compressed, in unilateral racemes 9. *Echinolaena*.

Spikelets solitary, not tuberculate nor uncinatate.

Inflorescence a single spike-like raceme; spikelets swollen on the side toward the axis and fitting into alternate hollows 10. *Mesosetum*.

* > Inflorescence a narrow panicle; spikelets swollen on the side away from the rachis or at least more convex on that side 11. *Leucophrys*.

First glume obsolete or not over $\frac{1}{4}$ the length of the spikelet.

First glume and rachilla joint forming a swollen ring-like callus ~~below~~ the spikelet, the glume reduced to an adnate sheath of the rachilla joint; fruit mucronate or shortly awn-pointed 12. *Eriochloa*.

at the base of

First glume present or wanting but no ring-like callus below the spikelet.

First glume present; racemes racemose along the main axis 13. *Brachiaria*.

First glume wanting; racemes digitate or subdigitate 14. *Axonopus*.

Spikelets placed with the back of the fruit turned toward the rachis of the spike-like racemes, or pedicellate in panicles.

Fruit long-acuminate, scarcely indurated, both glumes wanting; spikelets sessile, solitary in spike-like racemes, these reflexed or verticillate at maturity

15. *Reimarochloa*.

Fruit not long-acuminate, indurated (if but slightly indurated, both glumes present and inflorescence paniculate).

First glume typically wanting; spikelets plano-convex, subsessile in spike-like racemes 16. *Paspalum*.

First glume present; spikelets usually in panicles.

A Neither glumes nor lemmas awned.

Spikelet with a single fertile floret.

Second glume and sterile lemma not indurated, like the first glume in texture.

Glumes not equal nor entirely enclosing the rest of the spikelet.

* Rachis broadly winged, first glume large, broad beaked, bowed out at base; first floret staminate. *Panicum anatum*—what genus? not *Panicum*.

Fruit chartaceous-indurated the palea enclosed (rarely the tip free).

Second glume not inflated-saccate.

Culms not woody nor bamboo like.

Fertile lemma neither with lateral appendages nor excavations at base, the inrolled margins clasping the palea; inflorescence typically paniculate.

17. *Panicum*.

Fertile lemma either with lateral appendages or excavations at base, the margins usually not inrolled; first glume large; blades usually contracted into a petiole-like base . . . 18. *Ichnanthus*.

Culms usually woody, bamboo-like; spikelets globose, large, the glumes and sterile lemma papery; fruit bony-indurated, a downy tuft at the apex . . . 19. *Lasiacis*.

Second glume inflated-saccate, this and the sterile lemma much exceeding the stipitate fruit . . . 20. *Sacciolepis*.

— Fruit membranaceous, the palea not enclosed above; spikelets lanceolate, subsessile in usually spike-like panicles . . . 21. *Hymenachne*.

Glumes equal, enclosing the rest of the dorsally compressed spikelet; margins of the fertile lemma flat . . . 22. *Homolepis*.

Second glume and sterile lemma leathery-indurated; spikelets stipitate . . . 23. *Scutachne*.

Spikelets typically with two fertile florets.

Florets alike in form and texture; panicle compound . . . 24. *Isachne*.

Florets unlike, the lower lanceolate, exceeding the upper; panicle racemose.

25. *Heteranthoecia*.

AA Glumes or lemmas or both awned, or if short-pointed only, the summit of fertile palea not enclosed.

Inflorescence of unilateral racemes along a common axis, never digitate; glumes 2-lobed (rarely entire) awned from between the lobes; fruit indurated, the palea enclosed at the summit . . . 26. *Oplismenus*.

Inflorescence paniculate, ^{is} or of slender subsimple racemes, these digitate.

Spikelets never silky-pubescent, nor ciliate-margined, often scabrous or hispid.

Spikelets ovate, not having a callus-like base 27. *Echinochloa*.

Spikelets lanceolate, with a long callus-like base below the long-awned glumes.

28. *Chaetium*.

Spikelets silky pubescent or with a conspicuously ciliate margin; fruit subindurated.

Second glume and sterile lemma 2-lobed, a slender awn from between the lobes; fruit awnless; first glume remote; inflorescence paniculate . . . 29. *Tricholaena*.

Second glume and sterile lemma not lobed; fruit awned; first glume not remote; inflorescence of digitately arranged, subsimple racemes.

Sterile lemma and glumes papery, not at all indurated; fruit stipitate.

30. *Coridochloa*.

Sterile lemma subindurated similar to the fertile lemma 31. *Alloteropsis*.

32. Spikelets subtended or surrounded by 1 to many bristles or spines (sterile branchlets), these distinct or more or less connate at base, forming a pseudo-involucre.

Spikelets deciduous, bristles persistent.

Spikelet with lower floret as well as the upper perfect and with indurated lemma and palea. . . . 34. *Dissochondrus*.

Spikelet with upper floret only perfect.

Sterile palea at maturity becoming cartilaginous and winged, much exceeding the spikelet in width; spikelets secund along the branches of a simple panicle, each subtended by a single viscid bristle.

35. *Icophorus*.

Sterile palea not enlarged at maturity.

Second glume and sterile lemma very broad, many-nerved, the glume saccate, auriculate, the lemma lyre-shaped, indurated on the margins; the spikelet subtended by a single flexuous bristle. 32. *Setariopsis*.

Second glume and sterile lemma not many-nerved, saccate, auriculate nor lyre-shaped; subtending bristles 1 to many 33. *Chaetochloa*.

Bristles falling with the spikelets at maturity (in the cultivated *Pennisetum americanum* the globose grain falls from the usually persistent spikelet, with or without the lemma and palea attached).

palea free
at the summit

Rhynchochelytrum

*Setaria
glauca*

Articulation below the spikelet-bearing branchlets.

A single bristle produced beyond the solitary spikelets.

First glume present; second glume and sterile lemma
acuminate; fruit not acuminate . . . 36. *Chamaeraphis*.

First glume usually obsolete, second glume minute,
sterile lemma and fruit long-acuminate . . . 37. *Paratheria*.

Bristles numerous below each spikelet or cluster of
spikelets.

Bristles not united at base, usually slender, often plu-
mose 38. *Pennisetum*.

Bristles more or less united at base into a bur-like
pseudo-involucre 39. *Cenchrus*.

Articulation at the junction of the primary branches with
the main axis 40. *Plagiosetum*.

Spikelets either sunken in the cavities of a corky axis, or sur-
rounded by a sheath or by involucre-form bracts.

Spikelets sunken in the cavities of the flattened corky axis, this
disarticulating at maturity with the spikelets attached.

41. *Stenotaphrum*.

Spikelets not sunken in a corky axis.

Spikelets in small spikes, these surrounded by rigid sheaths.

42. *Xerochloa*.

Spikelets solitary, subtended by two glume-like bracts, these
placed cross-wise to the spikelet* 43. *Odontelytrum*.

4 Spikelets not all alike.

Plants monoecious or polygamous, that is with the different kinds
of spikelets on one plant.

Spikelets all perfect, but those of the aerial panicle not perfect-
ing grains; the fruitful spikelets cleistogamous, borne on
subterranean branches 44. *Amphicarpon*.

Spikelets not all perfect.

Spikelets hermaphrodite and sterile.

Spikes several, crowded on a leaf-like axis . . . 45. *Phyllorachis*.

Spike solitary 46. *Thuarea*.

Spikelets unisexual.

Inflorescence paniculate; fruit bony-indurated.

Panicles terminal on culms or leafy branches, pistil-
late spikelets above, staminate spikelets below,
in same panicle 47. *Olyra*.

Panicles all axillary or axillary and terminal; the
terminal when present wholly staminate.

Fruit laterally compressed, conspicuously gibbous
on upper dorsum 48. *Lithachne*.

Fruit dorsally compressed, lanceolate . . . 49. *Raddia*.

7 Inflorescence of spike-like racemes.

Raceme solitary; spikelets geminate, a pistillate and a
staminate forming a pair 50. *Diandrolyra*.

* Taken from Hackel's description. We have not yet seen the plant.

See Stapf
Hook. Icon
31: June 1916

See Hughes Bull. Misc. Inf. Kew 1923: 306. 1923.

- Racemes 2, digitate, one pistillate, the other staminate,
 the spikelets solitary 51. *Mniochloa*.
 Plants dioecious 52. *Spinifex*.

1. GENUS LEPTOCORYPHIUM Nees.*

Leptocoryphium Nees, Agrost. Bras. 83. 1829. Two species are included, *L. lanatum* Nees, based on *Paspalum lanatum* H. B. K., and *L. molle* Nees, the first named being here taken as the type of the genus.

2. GENUS ANTHAENANTIA Beauv.

Anthaenania Beauv. Ess. Agrost. 48. pl. 10. f. 7. 1812. Based on a single species, *Phalaris villosa* Michx. This name is spelled *Anthenania*† by Robert Brown (in Flinders, Voy. App. 2: 3582. 1814) and *Athenania*† by Kunth (Mem. Mus. Paris 2: 71. 1815).

Aulaxanthus Ell. Bot. S. C. & Ga. 1: 102. 1816. Two species, *A. ciliatus* Ell. and *A. rufus* Ell., the first named of which is here taken as the type, are included. The type of *A. ciliatus*, in Elliott's herbarium, is *Anthaenania villosa* (Michx.) Benth. Elliott refers "*Phalaris villosa*? Michx." to *A. ciliatus*. With the later fascicles of Elliott's work an illustration of *A. rufus* (pl. 6. f. 1), was given, but since this was not published until 1821 the first species published under the genus is taken as the type.

Aulaxia Nutt. Gen. Pl. 1: 47. 1818. This is based on *Aulaxanthus* Ell., Elliott's description, slightly altered, being used and his species cited. Steudel (Nom. Bot. ed. 2. 1: 171. 1840) spells the name *Aulaxis*.

3. GENUS VALOTA Adans.

= *Trichachne* Nees

Valota Adans. Fam. Pl. 2: 495. 1763. This genus is established by a reference to "Sloan. t. 14. f. 2." This figure identifies the genus with *Andropogon insulare* L. (Syst. Nat. ed. 10. 2: 1304. 1759). The type of the latter in the Linnaean Herbarium is from Jamaica, sent by Browne. After his diagnosis Linnaeus cites "Sloan. jam. t. 14. f. 2." Steudel (Nom. Bot. ed. 2. 2: 744. 1841) spells the name *Vallota*.

Acicarpa Raddi, Agrost. Bras. 31. pl. 1. f. 4. 1823. This is based on a single species, *A. sacchariflora* Raddi, the figure and description of which identify it with *Valota insularis*. Raddi also cites "Sloan. H. jam. I. p. 43. t. 14. fig. 2."

Trichachne Nees, Agrost. Bras. 85. 1829. Six species are included in the genus, *T. insularis* Nees which is taken as the type, based on *Andropogon insulare* L., *T. sacchariflora* (Raddi) Nees, which we now know to

*The group containing the first five genera here given was earlier discussed and the fruit of the type species figured (Proc. Biol. Soc. Wash. 19: 183-192. 1906). Only a summary of that discussion is here given, with such additional knowledge as has been gained.

† These misspellings or changes of spelling are here given only because these names have found their way into synonymy, hence must be accounted for.

be synonymous with the first, and four new ones, *T. recalva*, *T. tenuis*, *T. velutina* and *T. ferruginea*.

Since the notes on *Valota* were published* Prof. A. S. Hitchcock has examined the types of *T. tenuis* and *T. recalva* in Nees' herbarium at Munich, and duplicate types of *T. ferruginea* and *T. velutina* in the Trinius Herbarium. *Trichachne recalva* is seen to be allied to *V. Pittieri* (Hack.) Chase, while *T. ferruginea* and *T. velutina* approach *Syntherisma* through *S. adusta*. *Trichachne tenuis* Nees, upon which Kunth based *Panicum tenerrimum* (Rév. Gram. 1:39. 1829) is most nearly allied to *V. insularis*, but has much smaller spikelets with less copious and shorter hairs. None of these species are the one referred to† as represented in American herbaria by Nealley's Texas collections and passing under the name of *Panicum tenerrimum* Kunth. This very distinct species was collected in the summer of 1910 by Prof. A. S. Hitchcock, and is described below:

Valota Hitchcockii sp. nov. = *Trichachne*

Plants perennial, in dense clumps; culms erect, very slender, 30 to 50 cm. high, sparingly branching from the lower nodes, glabrous, usually very leafy, the lower nodes ascending-villous, the upper glabrous; sheaths about as long as the internodes or overlapping, the lower silky-villous, the middle and upper with a few, scattered, delicate hairs or glabrous or silky-ciliate only; ligule membranaceous, scarcely 0.5 mm. long, continued as a brown scarious margin down the sheath; blades ascending or erect, flat, 2 to 4.5 cm. long, 2 to 2.5 mm. wide, scarcely narrowed to the base, glabrous on the lower surface, minutely puberulent or glabrous on the upper, usually with a few long hairs near the base, and with a thin, white, cartilaginous margin; panicles consisting of few to several ascending racemes rather distant along a slender, glabrous axis, the rachises slender, 3-angled, the spikelets mostly in pairs, one short-pedicel, the other on a pedicel about as long as the lower spikelet, thus forming slender racemes, the spikelets scarcely imbricated; spikelets whitish or purplish, 2.5 to nearly 3 mm. long, 0.7 mm. wide, or with the hairs expanded about 1.2 mm. wide; first glume less than $\frac{1}{2}$ the length of the spikelet, obtuse, glabrous; second glume and sterile lemma equal, strongly 7- to 9-nerved, the internerves and margins densely silky hairy, the hairs at first appressed, at maturity spreading and matted, the spikelets often matted together by the tangled hairs; fruit 2.1 to 2.2 mm. long, 0.6 mm. wide, abruptly short-acuminate, brown, the broad, white, hyaline margins of the lemma nearly covering the palea except at the base.

Type collected June 24, 1910, on dry prairie soil, San Antonio, Texas, by A. S. Hitchcock (no. 5329).

Valota Hitchcockii is most nearly related to *V. saccharata* (Buckl.) Chase, from which it is distinguished by its lower stature, short blades, short racemes of smaller spikelets, the sterile lemma densely hairy on all the internerves, while in *V. saccharata* the middle four internerves are

* Proc. Biol. Soc. Wash., 19:186. 1906.

† Op. cit. p. 188.

glabrous, the hairs of the lateral internerves and margins and of the second glume being also much longer than in *V. Hitchcockii*; the fruit of the latter is much smaller, less acuminate and the lemma more broadly margined than in *V. saccharata*.

This species is known only from Texas. It was also collected by G. C. Nealley, at Sanderson, Pecos County, in September, 1892, and at Del Rio, October, 1892, both collections being distributed as no. 109.

Until the South American species referable to *Valota* are better known the transfer of Nees' species of *Trichachne* to this genus is deferred.

4. GENUS SYNTERISMA Walt. = *Digitaria* Huit

Sanguinella Gleichen, Mikrosk. Untersuch. 4. pl. 8. 1764. This includes a single species with a phrase name which is not directly associable with a previously published binomial, hence the genus is not technically published. The plate is a crude colored representation of *Syntherisma sanguinalis*.

Digitaria Haller, Stirp. Helv. 2:244. 1768, not Adanson, 1763. Haller includes two species, the first of which is Linnaeus' *Panicum sanguinale*, this name, however, being omitted and Linnaeus' diagnosis used instead as a phrase name.

Syntherisma Walt. Fl. Carol. 76. 1788. Three species are included, the first of which, *S. praecox* Walt., is taken as the type. Though there is no specimen of this now in Walter's herbarium,* there is little doubt that it is the same as *Panicum sanguinale* L. as stated by Michaux † and by Elliott. ‡

Gramerium Desv. Opusc. 61. pl. 7. f. 1. 1831. This includes a single species, *G. convolutum* Desv. We have not seen Desvaux's specimen but the description and figure apply well to the South American allies of *Syntherisma adusta* (Nees) Chase, and may possibly refer to a small specimen of that species itself.

Sanguinaria Bubani, Fl. Pyren. 4:256. 1901. Four species are included, the first of which, here taken as the type, is *S. nevadensis* Bub. From the synonyms and illustrations cited this is seen to be *S. sanguinalis*.

5. GENUS LEPTOLOMA Chase.

Leptoloma Chase, Proc. Biol. Soc. Wash. 19:191. 1906. Based on *Panicum cognatum* Schult., *L. cognatum* (Schult.) Chase.

6. GENUS CHLORIDION Stapf. §

Chloridion Stapf in Hook. Icon. Pl. 27:2 pl. 2640. 1900. A single species, *C. camerouni* Stapf, from "British Central Africa: * * * Namasi,

* For an account of the grasses in Walter's herbarium see Hitchcock, Sixteenth Ann. Rept. Mo. Bot. Gard. 44. 1905.

† Fl. Bor. Amer. 1:45. 1803.

‡ Bot. S. C. & Ga. 1:131. 1816.

§ It is intended to discuss in detail this and other extra-American genera in a later paper, when the spikelets of the type species will be figured.

Cameron, 15 (coll. of 1899),” is included in the genus. The type has not been examined but the description and plate identify the species with the following.

Stereochlaena Hack. Proc. Rhodesia Sci. Assoc. 7 : 2 65. 1908. One species, *S. Jeffreyssii* Hack., “Bulawayo, Maio, 1907, leg. Jeffreys, no. 46, 83.” Professor Hackel kindly sent spikelets of the type for deposit in the National Herbarium, and stated in a letter that *Stereochlaena* “is identical with *Chloridion* Stapf, Hook. Ic. 2640 (1900).”

In this genus the fruit is cartilaginous-indurated, brown, papillose, the margins of the lemma white and hyaline, as in the other genera of this group. The inflorescence consists of few to several slender racemes, digitate at the summit of the culm; the short-pediceled, lanceolate, spikelets are in pairs, the first glume is wanting, the second a minute scale; the sterile lemma is attenuate into a slender scabrous awn, 4 or 5 times longer than the body of the spikelet, and encloses a minute cleft palea. Stapf says “*Chloridion* might be described as a *Digitaria* in which the lower glume is entirely suppressed and the upper reduced to a scale, whilst the lower (barren) valve runs out into a fine bristle-like awn.”

7. GENUS *ACRITOTHAETE* Pilger.

Acritochaete Pilger in Engler, Bot. Jahrb. 32 : 53. 1902. The genus is based on one species, *A. Volkensii* Pilger (op. cit. 54) “Ost-Afrika, am Kilimandscharo, im Grütelwald oberhalb Marangu verbreitet, 2100 m. s. m. (VOLKENS n. 1278.)” A portion of a raceme from the type specimen was kindly sent to the National Herbarium by Dr. Pilger.

This genus like the preceding is very unlike any known American grass. In *Acritochaete* the scarcely indurated fruit is more like that of *Reimarchloa* or *Hymenachne* than like that of the preceding genera in texture, but the broad, white, thin-membranaceous margins of the lemma are like those found in this group. *Chloridion* is evidently related to *Syntherisma*, and *Acritochaete* is more nearly related to *Chloridion* than to any other known genus. The inflorescence consists of a few slender erect, distant racemes; the solitary, short-pediceled, lanceolate spikelets in two rows on one side of the slender raceme; the first glume is reduced to an obscure scale, the second glume and sterile lemma are attenuate into long, slender, more or less twisted and irregularly flexuous awns several times longer than the body of the spikelet, the awns of the several spikelets more or less entangled.

8. GENUS *THRASYA* H. B. K.

Thrasya H. B. K. Nov. Gen. & Sp. 1 : 120. pl. 39. 1816. This is based on a single species, *T. paspaloides* (op. cit. p. 121). “Crescit in calidis, subinundatis insulae Orinocensis Panumana, inter vicos Atures et San Borja.” The type has not been examined nor has any specimen of this species. The generic characters here given are based upon a study of specimens of *Panicum thrasyoides* Trin. (*Thrasya hirsuta* Nees) and *P.*

petrosum Trin. and the other two species here listed. Judging from Kunth's description and plate 39, and allowing for evident error in each, *Thrasya paspaloides* is closely related to *P. thrasyoides* Trin. Kunth places his *Thrasya* as the last genus of "Sectio I. Paniceæ" (about the equivalent of our subfamily *Panicoideæ*) immediately following *Manisuris granularis* (*Hackelochloa*). He diagnoses *Thrasya* as being 2-flowered, having two glumes, "superior profunde bipartita," the halves aristate below the apex, "inferior [gluma] integra mutica." The male floret is said to have but a single palea [both valves of a floret being termed paleae]. From dissections of spikelets of *P. thrasyoides* and from plate 39 the following conclusions are reached: Kunth overlooked the small, hyaline first glume (which in *P. thrasyoides* is more or less buried in the cleft of the sterile lemma and might easily escape notice); his entire, awnless, lower glume is the second glume; his deeply divided upper glume, the sterile lemma, the aristae of the halves being not awns (prolongations of fibrovascular bundles) but stiff, quill-like hairs; the single palea of the male floret is the sterile palea. It is strange that Kunth, failing to note the first glume, did not, nevertheless, count it as obsolete, since failing to do so, and counting the second glume as the first, he describes a spikelet in which the scales are not distichous, for his male floret is immediately above the (supposed) second glume instead of on the opposite side above the first. The margins of the sterile palea (in the allied *P. thrasyoides*) are so narrow and so readily torn from the hyaline middle portion that the fact that they turned toward the supposed second glume might escape observation. Kunth describes this "flos masculus" as "subtrinervia"—being a palea it has no midnerve, where Kunth evidently looked for one. But even if this [supposed] incongruous structure of the spikelet escaped him (if it did escape him) Kunth considered his *Thrasya* a most curious grass. He states that though it resembles *Paspalum platycaule* in habit, the structure of the flowers is so singular as to be widely different from that of all known genera. Nees (Agrost. Bras. 93. 1829) in his diagnosis of *Thrasya* notes a minute, scale-like inferior glume "(a cl. Kunth neglecta.)" The further important character that Kunth neglected, that is the alternately reversed position of the spikelets on the axis, Nees takes note of in his specific description of *Thrasya hirsuta* (based on *Panicum thrasyoides* Trin.), though Trinius failed to do so.

Description.—Inflorescence a single, terminal, more or less arcuate, spike-like raceme; spikelets apparently subsessile and solitary, in a single row on one side of a channeled, more or less winged rachis (the wings partially embracing the row of spikelets), but actually in pairs (the spikelets of each pair back to back) the pedicel of the primary spikelet adnate to the midnerve of the rachis* (the spikelets spreading from the

* To account for the alternation in position of spikelets, this was the interpretation arrived at by the writer from an examination of *P. thrasyoides* and *P. petrosum*, but I should not have ventured to give it at this time had I not found that it is the conclusion of Prof. Hackel (Oesterr. Bot. Zeitschr. 51:368. 1901) in the case of *Panicum campylostachyum*, in which species the paired arrangement is more evident than in *P. thrasyoides* and *P. petrosum*.

See Kunth Rev. Gram. 377 pl. 102. where
Kth. explains a little.

rachis at an angle of about 45 degrees), alternate spikelets placed with the back and alternate spikelets placed with the face toward the rachis (that is, the first glume alternately introrse and extrorse), a short callus below the spikelet; first glume minute, often hyaline and nerveless; second glume membranaceous, shorter than the spikelet; sterile lemma subindurated, thinner down the middle and early splitting to the base (the margins of the split rolling inward) or deeply sulcate only, the sterile palea nearly as long as its lemma, the nerves and margins firm, the broad internerve very thin, a staminate flower present or wanting; fruit oblong-elliptic, subacute, the lemma and palea cartilaginous-indurated, papillose, the summit of the lemma often clothed with stiff hairs, the thin margins flat, more or less pubescent. Slender, branching perennials, with narrow leaves, the genus confined to the tropics of the mainland of the western hemisphere.

The strictly racemose inflorescence, the alternation in the position of the spikelets, the subindurated, split or deeply sulcate sterile lemma, and the cartilaginous (not chartaceous) indurated lemma and palea, the thin margins of the lemma flat, taken in combination, are here used to distinguish *Thrasya* from *Panicum* and *Paspalum*. *Thrasya* approaches *Paspalum* through *Thrasya cultrata* and *Panicum campylostachyum* (in which the fruit is not hairy at the summit) on the one side and *Paspalum monostachyum* (H. B. K.) Vasey (in which the slightly indurated sterile lemma is somewhat sulcate and readily splits in dissection, and the firm margins of the papillose fertile lemma are not inrolled), on the other side. In the latter species, however, the paired spikelets are in two rows, and not in the alternately reversed position of those of *Thrasya*. If we conceive of a genus as bounded by an orbiculate line in places farther from, in places nearer to, the center (the species conceived to be the type of the genus) we have *Paspalum monostachyum* close to the line in one circle and *Panicum campylostachyum* and *Thrasya cultrata* close to the line in the adjoining one, the theoretical common ancestor of both long extinct. In such cases of extra-generic affinity it seems to be the nearest approach to a natural arrangement if we place the anomalous species in the genus to the members of which it is on the whole most nearly allied. And *Paspalum monostachyum* finds its nearest allies in *Panicum unispicatum* Scribn. & Merr. and a few other species of the section *Harpostachys* or *Dimorphostachys* of *Paspalum*.

The following species belong to this genus:

Thrasya paspaloides H. B. K. Nov. Gen. & Sp. 1:121. pl. 39. 1816.
(See above.)

Panicum thrasya Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3:228. 1834. Based on *T. paspaloides* H. B. K. Only the Humboldt and Bonpland specimen is mentioned. It is possible that this species has not been collected a second time.

Thrasya thrasyoides (Trin.).

Panicum thrasyoides Trin. Gram. Pan. 126. 1826. "Brasil. (LANGSDORFF)." The type specimen, in the Trinius Herbarium, is labeled

"*Panicum thrasyoides* m. ubique in campis siccis, Brasiliae crescens, leg. mense Dec. 1824. cl. Langsdorff."

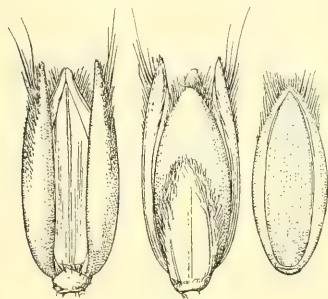


Fig. 1.

Thrasya thrasyoides.

(Two views of spikelet and fruit x 10 diam.)

Thrasya hirsuta Nees, Agrost. Bras. 94. 1829. Based on *P. thrasyoides* Trin. Nees distinguishes between this and *T. paspaloides*, a specimen of the original collection of which he examined in the Willdenow Herbarium. We take it on his authority that the two are distinct. So far as we know they have not been united, but they are closely allied and it seemed possible that Kunth's erroneous description might have led to failure to recognize his species.

***Thrasya petrosa* (Trin.).**

Panicum petrosum Trin. Gram. Icon. 3: pl. 280. 1836. Trinius states that the illustration is "ad specimen Brasilianum." The type specimen, in the Trinius Herbarium, labeled "*Panicum petrosum* m. Cuyaba febr. 1827," was probably collected by Langsdorff.

Tylothrasya petrosa Doell, in Mart. Fl. Bras. 2: 295. pl. 37. 1877. Based on *Panicum petrosum* Trin. Doell bases his genus *Tylothrasya* on this species, the basal callus being the character by which he differentiates it from *Thrasya* H. B. K. *Thrasya thrasyoides*, however, has this callus though it is less pronounced than in *T. petrosa*. Bentham (Linn. Soc. Journ. Bot. 19: 42. 1881) misspells the specific name "*petraeum*."

***Thrasya cultrata* (Trin.) Nees, Agrost. Bras. 94. 1829.**

Panicum cultratum Trin. Gram. Pan. 126. 1826. "Brasil (LANGSDORFF)." The type specimen, in the Trinius Herbarium, is labeled "*Panicum cultratum* m. In graminosis, m. da Congonhas, Brasil. leg. mense Jan. 1825. cl. de Langsdorff. *Thrasya cultrata* N. ab Esenb." Above this the name "*cultratum*" had been written and crossed out, apparently by Trinius himself, and "*monostachyum* Hb. Kth." added. In his later work, "*Panicearum Genera*" (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3: 228. 1834) Trinius gives *P. cultratum* as a synonym of *P. monostachyum*.

***Thrasya campylostachya* (Hack.).**

Panicum campylostachyum Hack. Oesterr. Bot. Zeitschr. 51: 367. 1901. "Costarica; in savannis ad Cañas Gordas leg. Pittier, nr. 11012 et 11018." The type (no. 11012) is in Hackel's herbarium, a duplicate is in the National Herbarium.

This and the preceding species differ from the first three here listed in the lack of the quill-like hairs on the halves of the split sterile lemma, and also on the summit of the fruit.

There are several South American species, *Panicum Schumannii* Pilger among them, at present insufficiently known to us, which belong in this genus.

9. GENUS ECHINOLAENA Desv.

Echinolaena Desv. Journ. de Bot. Paris 1 : 75. 1813. This genus is based on a single species, *E. hirta* Desv. (l. c.) "*Habitat in America equinorali.*" The type specimen, bearing in Desvaux's handwriting the name and date as published, is in the herbarium of the Muséum d'Histoire Naturelle at Paris.

Echinolaena was recognized as a genus by Kunth (H. B. K. Nov. Gen. & Sp. 1 : 118. 1816, Rév. Gram. 1 : 54. 1829, and Enum. Pl. 1 : 171. 1833), and by Trinius in his earlier work (Gram. Pan. 75. 1826), though later (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : 230. 1834) he includes it under his section *Harpostachys* of *Panicum*. Nees (Agrost. Bras. 127. 1829) makes it a section of *Panicum*. Steudel follows Trinius' later disposition of the genus, as does Doell (Mart. Fl. Bras. 2 : 179. 1877). Bentham (Linn. Soc. Journ. Bot. 19 : 50. 1881) maintains *Echinolaena* as a genus because of its having "the rigid single spike of some Chlorideae," and in the Genera Plantarum (Benth. & Hook. Gen. Pl. 3 : 1107. 1883), also, he gives it generic rank. Hackel (Engler & Prantl, Pflanzenf. 2 : 235. 1887) reduces it to a section of *Panicum*.

Description.—Inflorescence of one dense and spike-like, or several rather loose racemes; spikelets in pairs, face to face, the primary short-pedicel and perfect the secondary subsessile, abortive (sometimes developed, rarely wanting), the back of the primary spikelet turned toward the axis (that is the back of the fruit turned from the axis), in two rows along one side of a flat rachis and more or less divergent from it; fertile spikelets laterally subcompressed, echinate, at least at maturity; glumes broad, firm, acuminate-pointed, one or both echinate at maturity, the first straight and as long as the spikelet or longer, the second boat-shaped or becoming ventricose; sterile lemma broad, acuminate, enclosing a nearly equal sterile palea and usually a staminate flower; fruit indurated, less so than usual in *Panicum*, plano-convex, elliptical, the margins of the lemma flat or inrolled at the summit only, a minute membranaceous wing or spongy thickening on either side at base. Freely branching, more or less decumbent or creeping herbs, the type species confined to the South American tropics, another of widespread tropical distribution and a third of Madagascar.

The statement made by Bentham (Benth. & Hook. Gen. Pl. 3 : 1107. 1883): "*rhachi spicæ rigida ultra spiculas producta,*" and which appears from the Conspectus (page 1078) to express his chief reason for maintaining *Echinolaena* as a valid genus, is found to be erroneous. The uppermost spikelet in *E. scabra* (*E. hirta*), the one species Bentham admitted to the genus, (as well as in *E. polystachya*) is strictly terminal, the rachis not at all produced beyond its insertion. This uppermost spikelet is solitary and usually erect, and the first glume is long-acuminate

(longer than in the other spikelets) and has much the appearance of a hirsute prolongation of the rachis. The characters to which we here give chief weight as generic are the strictly racemose inflorescence, the paired spikelets face to face (exactly the opposite arrangement to that in *Thrasya*), the lower or secondary spikelet of the pair abortive or usually so, the fertile spikelet with its back to the axis (as in *Brachiaria*), the long first glume, and the fruit less indurated than in *Panicum*.

Raceme solitary, terminal on the culm or branches; second glume boat-shaped only *E. inflexa*.
 Racemes several, erect, distant along a common axis; second glume becoming ventricose and uncinately spiny at maturity . . . *E. polystachya*.

***Echinolaena inflexa* (Poir.).**

Cenchrus inflexus Poir. Encyc. Suppl. 6 : 50. 1804. "M. Richard l'a recueillie à Cayenne. (V. s. in. herb. Jussieu & Lam.)" The type specimen in the herbarium of the Muséum at Paris was examined by Prof.

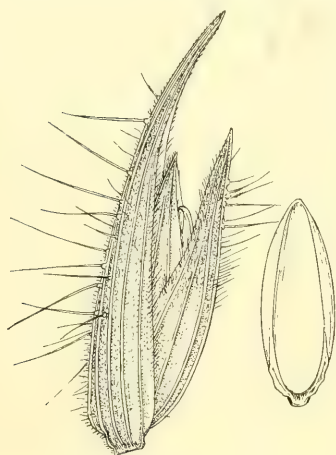


Fig. 2.
Echinolaena inflexa.
 (Spikelet and fruit $\times 6\frac{1}{2}$ diam.)

Hitchcock and found to be the same species as the type of *Echinolaena hirta* Desv. in the same herbarium. Trinius (Gen. Pan. 75. 1826) also referred *C. inflexus* Poir. to *E. scabra* H. B. K. Poiret observes that he finds no involucre, that the species may belong to another genus, and that it deserves further study.

Cenchrus marginalis Rudge, Pl. Guian. 19. pl. 25. 1805. No locality nor specimen is cited. The type has not been examined but the plate and description identify the species.

Echinolaena hirta Desv. Journ. de Bot. Paris 1 : 75. 1813. (See above.)

Echinolaena scabra H. B. K. Nov. Gen. & Sp. 1 : 118. pl. 38. 1816. "Crescit in ripa umbrosa Atabapense juxta vicum San Balthasar et rupem Kemarum.

(Prov. de la Nueva Guayana.)" The type specimen has not been examined but the plate and description identify the species.

Panicum echinolaena Nees, Agrost. Bras. 128. 1829. Nees divides the entire species into three varieties, α , β and γ and cites "*Echinolaena scabra* H. et K." as a synonym without indicating to which variety he considers it synonymous. Since he also cites specimens we can not consider *P. echinolaena* a change of name only. "Var. α et β in Brasilia meridionali. (Sellow.) Vidi in Herb. Reg. Berol.)—Var. γ in campis siccis ad Tanbaté nec non Sabara, provinciarum S. Pauli et Minarum * * * (Martius)." The specimens referred to as α and β have not been examined. The Martius specimen, the type of var. γ , in the Munich

Herbarium, is the villous form represented in the National Herbarium by *Novaes* 1248, Campinas, Brazil.

Genus *Pseudochinolaena* Stapf based on this, accepted by A. S. H.

Echinolaena polystachya H. B. K. Nov. Gen. & Sp. 1:119. 1816.

"Crescit in ripa fluminis Magdalene inter Tenerife et Zambrano."

A part of the type, labeled "*Echinolaena polystachya* H. B. K. in ripa fluminis Magdalena, ex herb. Humb. & Bonpl.," was examined in the Berlin Herbarium. As indicated by Nees (Agrost. Bras. 129. 1829) and Trinius (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3:240. 1834) this is the same as *Panicum uncinatum* Raddi.

Panicum uncinatum Raddi, Agrost. Bras. 41. 1823. "In sylvaticis prope Catumby, non procul ab Urbe Rio de Janeiro." An authentic specimen from Raddi (probably a duplicate type) was examined in the herbarium of the British Museum.

Panicum heteranthum Link, Hort. Berol. 1:212. 1827. "Hab. in Brasilia." An authentic specimen from the Berlin Botanical Garden was examined in the Trinius Herbarium. The description also identifies the species.

Panicum glandulosum Nees, Agrost. Bras. 129. 1829. "Habitat in sylvis ad Xipotó et ad Rio Jequetinhonha flumina (Martius)" is the first specimen cited, "in confinibus regni Paraguayan legiti Sellovius (Vidi in Herb. Reg. Berol.)" an additional one. The Sellow specimen was examined at the Berlin Herbarium. Nees gives *Echinolaena polystachya* H. B. K. and *Panicum uncinatum* Raddi as synonyms. Trinius (Gram. Pan. 174. 1826) gives "*Panicum glandulosum* N. ab Es. in litt." (as well as *P. uncinatum* and *Echinolaena polystachya*) without description as a synonym of *Panicum nemorosum* Swartz var. β .

Echinolaena Trinii Zoll. & Mor. Syst. Verz. Zoll. 102. 1846. Based on "*Panicum uncinatum* Trin. v. 3. non Brown." The reference to Trinius is probably to the "Panicearum Genera" (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3:240. 1834). The name published by Brown is *P. uncinatum* not *P. uncinatum*.

Panicum echinatum Willd.; Doell in Mart. Fl. Bras. 2:2193. 1877. This herbarium name is given as a synonym of *P. uncinatum* Raddi. The specimen, in the Willdenow Herbarium, bears the data "Magdalena, Humboldt," and is doubtless a duplicate of the type of *E. polystachya*.

Immature specimens of this species bear a superficial resemblance to *Ichnanthus nemorosus* (Sw.) Doell, and allied species. Trinius, as seen above, at first included it as an unnamed variety of *Panicum nemorosum*, but later (Gram. Icon. 2: pl. 216. 1829) gives *Panicum uncinatum* as a valid species, explaining that though it resembles *P. nemorosum* it differs in having a subcoriaceous lower floret, and, in the upper racemes, spikelets in which the prickles of the "inferior glume" [the plate shows the second glume is intended] are so dense and long as to produce a resemblance to spikelets of *Lappago* [Nazia]. Because of the racemose inflorescence Trinius here and in the Panicearum Genera (Mém. Acad. St. Pétersb.

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VI. Sci. Nat. 3 : 240. 1834) places *P. uncinatum* in the section *Brachiaria*.

Kunth (Rév. Gram. 1 : 54. 1829) doubtfully refers to *Echinolaena* his own *E. polystachya*, together with *Panicum nemorosum* Sw., *P. naviculare* Nees (both of which belong in *Ichnanthus*) and *P. brachystachyum* Nees and *P. procurrens* Nees. In his synoptical heading the character "gluma superior echinato-glochidata" would exclude all but *E. polystachya*. In the Enumeratio (Enum. Pl. 1 : 173. 1833) Kunth again doubtfully includes these species and adds *Panicum loliaceum* Bert., probably referable to *Ichnanthus*.

While the uncinat and ventricose second glume of the mature spikelet of this species makes it look very different from spikelets of *E. inflexa*, the paired spikelets, the primary fertile, the secondary abortive or rudimentary, placed face to face, the back of the primary one turned toward the rachis, and the essentially like structure of the spikelet to that of *E. inflexa* show the two species to be congeneric. The second glume becomes indurated and spiny only as the spikelet nears maturity; the immature spikelets resemble those of *E. inflexa*. The sterile spikelet is often reduced to a mere rudiment, is sometimes wanting, and is rarely developed like the primary spikelet. In the fifty specimens of this species in the National Herbarium none are found without some of these sterile spikelets in the racemes.

From the description, *Echinolaena madagascarensis* Baker, a species which we have not seen, appears to belong unmistakably to this genus.

10. GENUS MESOSETUM Steud.

Mesosetum Steud. Syn. Pl. Glum. 1 : 118. 1854. This is based on a single species, *M. cayennense* Steud. (l. c.) "*Leprieur legit in Cayenne.*" The type specimen, labeled "*Mesosetum cayennense* Steud. Cayenne. Leprieux, 1825," in the Steudel Herbarium at Paris, is found to be the same species as *Panicum rottboellioides* H. B. K. Steudel earlier (Flora 33 : 228. 1850) mentions the name in a paper on the progress of his work on the "Synopsis plantarum." The generic description as given by Steudel is faulty and misleading. He evidently became confused as to the morphology of the parts of the spikelet. But reading his description with a dissected spikelet of *P. rottboellioides* under the microscope one can see that this is what Steudel is trying to describe. It seems likely from his description of the "flosculus hermaphroditus" that he mistook the sterile lemma with the fertile floret enfolded for the hermaphrodite floret (that is mistaking the fertile lemma for the "second valve" of the floret). Steudel's statement that *M. cayennense* approaches *Panicum mesocomum* Nees is further misleading. For this reason the name *Mesosetum* has been referred to various sections of *Panicum* but never, so far as we can find, to the group containing *Panicum rottboellioides*, until so used by Hitchcock (Contr. Nat. Herb. 12 : 211. 1909). Bentham (Linn. Soc. Journ. Bot. 19 : 42. 1881) says that *Panicum leucophaeum* H. B. K. (which is *Panicum insulare* (L.) Meyer, *Valota insularis* (L.) Chase)

Trichachne Nees

"appears to have been the type of the proposed genera *Acicarpa*, Raddi, *Eriachne*, Philippi, and *Holosoetum* and *Mesosoetum* Steud." (It is in fact the type of only the first-named of these.) In the *Genera Plantarum* (Benth. & Hook. Gen. Pl. 3 : 1101. 1883) he says that *Mesosoetum* is perhaps (*forte*) referable to the section *Trichachne* of *Panicum*. At the same time Bentham (Linn. Soc. Journ. Bot. 19 : 42. 1881) establishes as a section of *Panicum* his *Diplaria* comprising "*P. rottboellioides*, H. B. K., *P. exaratum* and *P. ferrugineum* Trin., *P. pappophorum*, Nees, and a few others." In the *Genera Plantarum* (l. c.) this section is described and the same species mentioned as belonging to it. Dalla Torre and Harms (Gen. Siphonog. 14. 1900) also include *Mesosoetum*, together with *Alloteropsis* Presl, *Coridochloa* Nees, *Eriachne* Phil., as well as *Acicarpa* Raddi and *Trichachne* Nees which properly belong there, under *Panicum*, section *Trichachne*. Steudel himself failed to see the identity of his *Mesosoetum cayennense* with *P. rottboellioides* or its affinity to the other species of this group which he includes under the section *Harpostachys* (Syn. Pl. Glum. 1 : 55. 1854). It was only Prof. Hitchcock's examination of the type specimens of *Mesosoetum cayennense* and *P. rottboellioides*, both now in the Herbarium of the Muséum d' Histoire at Paris, that revealed the specific identity of the two. It is unfortunate that Steudel's generic name, with its inadequate description, must stand for this well-marked genus. But if the names of all incorrectly described genera were rejected the nomenclature of the *Gramineæ* would undergo many changes, for this family seems particularly to have suffered from the misunderstanding by authors, of the morphology of the parts of its inflorescence. *Anthaenantia*, *Ichnanthus*, *Alloteropsis* and *Pentarrhaphis* are examples of valid genera incorrectly described by the authors who bestowed the names we use for them.

Description.—Inflorescence a single, terminal, erect, spike-like raceme, the spikelets subsessile, solitary, alternate in two rows on one side of a three-angled, rarely winged, tortuous or zigzag rachis, the spikelets with the back of the fruit turned from the median line of the rachis (the first glume towards it), ventricose on the side toward the rachis, and fitting into its concavities, the back of the spikelet flat or nearly so; glumes 3- to 5-nerved (when 5-nerved the lateral pairs of nerves approximate) the lateral nerves often uniting with the midnerve below the acute or acuminate summit, one or both usually clothed on the margin with stiff hairs; sterile lemma like the glumes in texture and the distribution of the pubescence, usually appearing 2-keeled from the strong lateral nerves and firm lateral internerves and thin or hyaline middle internerves and weak midnerve; sterile palea wanting except in the section *Bifaria*; fruit pointed, ventricose on the face (palea side) usually straight on the back, the lemma and palea less indurated than in *Panicum*, the flat margins of the lemma not hyaline. Slender perennials with narrow leaves, the uppermost reduced to a bladeless or nearly bladeless sheath.

This genus, like *Brachiaria*, differs from *Panicum* in the strictly racemose inflorescence and reversed position of the spikelets, and further in the form of the spikelets, swollen or ventricose on the face (or first glume

side) instead of on the back as in *Panicum*, *Paspalum* and, in more or less pronounced form, in all other genera of the *Panicææ*. The fruit differs from that of *Panicum* in having less indurated lemma and palea, the margins of the lemma flat. Doell (in Mart. Fl. Bras. 2 : 2173. 1877) states that in this group of plants the caryopsis has a linear hilum, but the specimens in the National Herbarium are not mature enough to permit of verification of this statement. The genus is confined to the tropics of the western hemisphere, Brazil being the center of distribution, two species occurring in the West Indies.

Besides *Mesosetum* proper the genus contains a well-marked section.

First glume awnless; lower floret neuter *Mesosetum* proper.

First glume awned; lower floret staminate Section *Bifaria*.

MESOSETUM proper.

This contains the following species:

Mesosetum rottboellioides (H. B. K.) Hitchc. Contr. Nat. Herb. 12 : 211. 1909. Based on *Panicum rottboellioides* H. B. K.

Panicum rottboellioides H. B. K. Nov. Gen. & Sp. 1 : 96. pl. 32. 1816. "Crescit in humidis ripæ Orinocensis inter Maypures et montem Sipapo."

Mesosetum cayennense Steud. Syn. Pl. Glum. 1 : 118. 1854. (See above.)



Fig. 3.

Mesosetum rottboellioides.

(Spikelet, first glume, second glume, sterile lemma and fruit x 10 diam.)

Mesosetum Wrightii Hitchc. Contr.

Nat. Herb. 12 : 211. 1909. "Wright 3859 no. 559961 in the U. S. National Herbarium."

This species is known only from Cuba.

Mesosetum exaratum (Trin.).

Panicum exaratum Trin. Gram. Pan. 160. 1826. "Brasil. (LANGSDORFF.)" The type specimen, in the Trinius Herbarium, is labeled "Panicum exaratum m. In pratis paludosis S. da Lapa. Brasil. leg. cl. de Langsdorff."

Panicum pappophorum Nees, Agrost. Bras. 104. 1829. "Habitat * * * provinciae Piauiensis." The type specimen, in the Munich Herbarium, bearing the name and locality as published, was collected by Martius.

Mesosetum loliiforme (Hochst.) Chase, Bot. Gaz. 51 : 302. 1911. Based on *Panicum loliiforme* Hochst.

Panicum loliiforme Hochst. in Steud. Syn. Pl. Glum. 1 : 56. 1854. "Herbr. Dr. Hostmann nr. 1071." The type specimen is in the herbarium at Leipzig.

This is the not uncommon Cuban species which has been usually referred to *P. rottboellioides* in herbaria. It differs from *M. rottboellioides* and *M. Wrightii* in having glumes each bilaterally unsymmetrically developed, the second shorter than the first instead of being the longest scale of the spikelet as in *M. rottboellioides*; *M. loliiforme* also differs in being sparingly stoloniferous.

Nees' *P. pappophorum* var. β , his specimen of which, also collected by Martius in Brazil, is now in the Munich Herbarium, is either *M. loliiforme* or a very closely allied species.

Mesosetum chlorostachyum (Doell).

Panicum chlorostachyum Doell in Mart. Fl. Bras. 2² : 173. pl. 28. A. 1877. "Habitat in regionibus fluminis Rio Negro (Spruce n. 885, 1310)." Spruce's no. 885 is in the Munich Herbarium.

Mesosetum ferrugineum (Trin.)

Panicum ferrugineum Trin. Gram. Pan. 1826. "Brasil (LANGSDORFF)." The type specimen, in the Trinius Herbarium, is labeled "Panicum ferrugineum m. In campis glareosis pr. S. Luzia, Brazil. I. mense Oct. 1824. cl. LANGSDORFF."

Panicum eriochryseoides Nees, in Trin. Gram. Pan. 160. 1826. This name is given as a synonym of *P. ferrugineum*. Nees (Agrost. Bras. 103. 1829) publishes this as a new species citing a specimen collected in Brazil by Sellow, "Vidi in Herb. Reg. Berol." What is evidently a duplicate of this is in the Trinius Herbarium. Nees gives "*Panicum ferrugineum* Tr. in litt." as a synonym of *P. eriochryseoides*.

Mesosetum sclerochloa (Trin.) Hitchc. Contr. Nat. Herb. 12 : 212. 1909. Based on *Panicum sclerochloa* Trin.

Panicum sclerochloa Trin. Gram. Icon. 3 : pl. 283. 1836. The illustration is drawn "ad specimen Brasilianum." The type, in the Trinius Herbarium, is labeled "*Panicum sclerochloa* m. pr. Cuyaba febr. 1827."

This peculiar species shows an approach to the species of the section *Bifaria* in the thickened midnerve of the first glume, keeled toward the apex and protruding as a short, laterally compressed point from between the lobes of the slightly cleft summit of the glume. The midnerve of the second glume and that of the sterile lemma are similarly keeled.

Besides the species listed above, *Panicum lolium* Nees, the type specimen of which has not been examined, and a few other insufficiently known South American species belong in this genus.

Section BIFARIA (Hack.).

Hackel (Oesterr. Bot. Zeitschr. 47 : 75. 1897) establishes *Panicum*, section *Bifaria* with three new Brazilian species, *P. bifarium*, *P. caudiculatum* and *P. elythrochaetum*. Professor Hackel kindly contributed to the National Herbarium a spike from the type specimen of *P. bifarium*; the other two species have not been examined. The spikelets of *P. bifarium* have the structure and reversed position characteristic of *Mesosetum* but differ strikingly in the character of the first glumes. In these the mid-nerve, which (as in most species of *Mesosetum* proper) is joined by the lateral nerves, is keeled toward the summit of the notched glume and extends into a laterally compressed, sinuous, stout awn, varying from a short point to as long again as the spikelet. The species differs further from those of *Mesosetum* proper in having a staminate flower in the lower floret. Prof. Hackel points out the relationship of his section *Bifaria* to Bentham's section *Diplaria* (*P. rottboellioides*, *P. loliiforme*, etc.), and because of this relationship establishes for his three species a section of *Panicum* instead of a new genus. But unless the boundaries of the genus *Panicum* are extended to the limits to which Trinius (Gram. Pan. 1826) stretched them, including *Paspalum*, *Oplismenus*, *Setaria* and other genera recognized as distinct by even the most conservative students of *Gramineæ*, the species here referred to *Mesosetum* with their constant combination of characters and their sharp delimitation from *Panicum* (there being no intergrading species as between *Panicum* and *Paspalum* and between *Panicum* and *Chaetochloa*) can not well find place therein.

The only species of the section *Bifaria* we have seen is here transferred:

Mesosetum bifarium (Hack.).

Panicum bifarium Hack. Oesterr. Bot. Zeitschr. 47 : 76. 1897. "Serra da Baliza ad Cachoeiras da Vargem Grande, 5-I. 1895, Glaziou nr. 22455."

Bifaria bifaria Kuntze, Gen. Pl. 3 : 2359. 1898. Based on *Panicum bifarium* Hack. Kuntze, apparently without having seen the species, raises Hackel's section, on account of the lobed and awned first glumes, to generic rank in order to be consistent, he having maintained *Oplismenus* and *Chaetium* as distinct genera, he says, because of this characteristic.

11. GENUS LEUCOPHRYS Rendle.

Leucophrys Rendle, Cat. Afr. Pl. Welwitsch 2 : 1193. 1899. This genus is based on a single species, *L. mesocoma* (Nees) Rendle (op. cit. 194) based on *Panicum mesocomum* Nees, an African species. In this genus the spikelets are placed with the back of the fruit turned from the axis, but, not being strictly racemose, this is not readily observed. The rachilla is produced into a short stipe below the first glume which is separated from the second by the slightly prolonged second joint of the rachilla. The nearly glabrous first glume about as long as the spikelet and the densely silky second glume and sterile lemma, as well as the narrow

panicle and the reverse position of the spikelets, suggest an approach to the unique North American *Panicum ciliatissimum* Buckl. The stipitate spikelet of *Leucophrys*, however, with a joint between the glumes, and the different arrangement of the silky pubescence on the second glume and sterile lemma (a dense ring of long hairs across the middle of the spikelet, an arrangement also found in *Panicum nigropedatum*, *P. serratum*, *P. argenteum*, etc., and approached in several species of *Eriochloa*) does not show a close affinity with *P. ciliatissimum*. Species intermediate between them may be found, but without such intermediate species our *P. ciliatissimum* finds a more natural place in *Panicum*. Study of more material may show that *Panicum argenteum* and its allies should be placed in *Leucophrys*.

Rendle (l. c.) places *Leucophrys* immediately before *Tricholaena* to which he compares it. The silky spikelets resemble outwardly those of *Tricholaena* but the indurated fruit and membranaceous, entire and awnless second glume and sterile lemma indicate but remote relationship to that genus. The two, however, probably belong closer together than is indicated by their relative position in the sequence here given, but it must be borne in mind that any lineal arrangement of that which is really irregularly radiate must fail to show all but the closest relationship.

12. GENUS ERIOCHLOA H. B. K.

Eriochloa H. B. K. Nov. Gen. & Sp. 1: 94. pl. 30 and 31. 1816. Two species are included, *E. distachya* H. B. K. (1. c. pl. 30) "Crescit in ripa Orinoci fluminis inter Santa Barbara et Esmeraldam," and *E. polystachya* H. B. K. (1. c. pl. 31.).

Since both are illustrated and are equally covered by the generic description the first species is here taken as the type of the genus. A duplicate type of this, "Ex herb. Humboldt," was examined in the Berlin Herbarium.

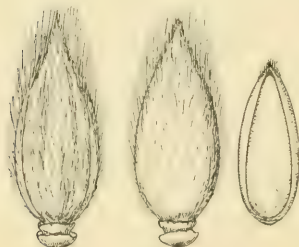


Fig. 4.

Eriochloa distachya.

(Two views of spikelet and fruit x 10 diam.)

Helopus Trin. Fund. Agrost. 103. pl. 4. 1820. A single species, *H. pilosus* Trin. (op. cit. 104) is included. Since the genus only and not the species is described and since no specimen is cited we should consider the species based on *Milium ramosum* Retz., which is cited as a synonym,

save for the fact that plate 4 shows an aristate lemma while Retz. (Obs. Bot. 6: 12. 1791) states that the "valvula exterior" is mucronate only, and that Trinius later (Gram. Pan. 118. 1826) gives *Helopus pilosus* Trin. as a synonym of *Paspalum punctatum* Flüge (*Milium punctatum* L.), while *Milium ramosum* Retz. he gives as a synonym of *Paspalum annulatum* Flüge. In the Trinius Herbarium is a specimen collected by Mikan in Brazil, which is marked in Trinius' hand "*Helopus pilosus* m. *Paspalum punctatum* Flüge." Whether or

not this specimen be taken as the type of *H. pilosus* we know that the species *Eriochloa punctata* (L.) Hamilt. (Prod. Pl. Ind. Occ. 5. 1825), based on *Milium punctatum* L., should be taken as the type of the genus *Helopus* Trin.

Trinius places *Eriochloa* H. B. K. immediately after *Helopus* in his systematic arrangement and (page 75) differentiates the two as follows:

Racemi ad rachin communem. Cor. apice mucronato-aristata *Helopus*.
 Racemi subpaniculati. Involucrum stellato-setosum! *Eriochloa*.

Probably Trinius had not at that time seen Kunth's species and was impressed by Kunth's description of an involucre of numerous hairs at the apex of the pedicel and by the ring of spreading hairs shown in plate 30. Later (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : 130 and 133. 1834) the species of both *Eriochloa* and *Helopus* are placed in *Paspalum* in the subdivision *Helopus*.

Oedipachne Link, Hort. Berol. 1 : 51. 1827. This includes a single species, *O. punctata* Link (l. c.), based on *Milium punctatum* L. In his additions and emendations (p. 273) Link directs that *Oedipachne* be expunged and *Helopus* Trin. be inserted in its place, and in the second volume (Hort. Berol. 2 : 199. 1833) *Helopus* is given as a genus with *Oedipachne* as a synonym. *Eriochloa* H. B. K. seems to have been overlooked by Link.

Alycia Willd.; Steud. Nom. Bot. ed. 2. 1 : 66. 1840. This herbarium name is listed without description, and two undescribed species, *A. coarctata* Willd. and *A. distachya* Willd., are listed under it. Both names are here referred to *Helopus brachystachys* but on page 747 *A. coarctata* Willd. is referred to *Paspalum polystachyum* Trin. and *A. distachya* to *P. brachystachyum* Trin. *Helopus brachystachys* Trin. (upon which *Paspalum brachystachyum* is based) is *Eriochloa distachya* H. B. K. or a very closed allied species, while *Paspalum polystachyum* Trin. is based on *Eriochloa polystachya* H. B. K., so that whichever species be taken as the type of *Alycia* this name becomes synonymous with *Eriochloa* H. B. K. Willdenow's herbarium name is spelled "Aglycia" by Steudel (op. cit. 37) with the same two species listed under it.

Nees (Agrost. Bras. 16. 1829) recognizes *Helopus* Trin. as a genus, and does not mention *Eriochloa*. Probably since neither of Kunth's species was from Brazil Nees neglected to study the genus.

Doell (Mart. Fl. Bras. 2 : 123. 1877) recognizes *Helopus* Trin. as a genus, and includes *Eriochloa* H. B. K. under it. Bentham (Benth. & Hook. Gen. Pl. 3 : 1099. 1883) recognizes *Eriochloa* H. B. K.

Nash (Bull. Torrey Club 30 : 374. 1903) takes up the name *Monachne* Beauv. for this genus, but we do not find this name tenable. It is based on *M. unilateralis* Beauv., an undescribed species unrecognizable from the figure, which represents a branching paniculate inflorescence, though the spikelets were evidently drawn from some species of *Eriochloa*, and *Saccharum reptans* Lam., which is a species of *Panicum* allied to *P. urvilleanum* Kunth.

Description.—Inflorescence of one to many, usually dense, racemes along a common axis; spikelets solitary, sometimes in pairs, short pediceled or subsessile in two rows on one side of a narrow, usually hairy rachis, the pedicels often clothed with long stiff hairs [the "involucre" of Kunth], the back of the fertile lemma turned from the rachis; spikelets dorsally compressed, more or less pubescent, stipitate by the lengthening of the internode of the rachilla below the second glume into a more or less ring-like, usually dark-colored callus, the first glume reduced to a minute sheath about this internode and adnate to it; second glume and sterile lemma equal or nearly so, acute or acuminate, the lemma usually enclosing a hyaline palea and sometimes a staminate flower; fruit indurated, less so than in *Panicum*, minutely papillose-rugose, the lemma mucronate-pointed or aristate, sometimes pubescent at the apex, the margins slightly inrolled. Perennial herbs with linear leaves and terminal panicles of few to many racemes, confined to the warmer temperate and tropical regions of both hemispheres.

This genus approaches *Leucophrys* and *Brachiaria* through such species as *Panicum nigropedatum* Munro, *P. argenteum* R. Br., and *P. serratum* R. Br. in which the first glume is well developed above the more or less stipitate base.

13. GENUS BRACHIARIA (Trin.) Griseb.

Brachiaria Griseb. in Ledeb. Fl. Ross. 4: 469. 1853. Grisebach here raises "*Panicum* sect. *Brachiaria* Trin." (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3: 2 194. 1834) to a genus, including under it a single species

B. eruciformis (Smith) Griseb. based on *Panicum eruciforme* Smith (Sibth. Fl. Graec. 1: 44. pl. 59. 1806). "In arvis circa Junonis templum in insula Samo." The plate is a good representation of the species and fully identifies it. The enlarged portion of the raceme (f. A) shows that the spikelets are placed with the first glume toward the axis. This species we here take as the type of the genus. Roemer & Schultes (Syst. Veg. 2: 426. 1817) misspell the name "*eruciforme*," and in this form also it appears in the Index Kewensis under *Brachiaria*.



Fig. 5.
Brachiaria eruciformis.
(Two views of spikelet and
fruit x 10 diam.)

Grisebach cites not the first work in which Trinius proposes the subgenus *Brachiaria*, but a later work, in which Trinius includes a somewhat different group of species from those included in his first establishment of the section in "De Graminibus paniceis" (pages 51 and 125. 1826). Here (p. 51) the section is diagnosed as follows: Racemes simple, regularly or irregularly alternate; spikelets oblong (rarely lanceolate), either in regular series and imbricated or laxly disposed; lower glume manifest, awnless. Under it are included "Thrasya Kth.? * * *

Urochloa Pal. [de Beauv.] * * * *Streptostachys* Desv., *Echinochloa* Pal." In the body of the work (p. 125) the first species included under section *Brachiaria* is *Panicum decumbens* Roem. & Schult. (*Paspalum decumbens* Poir.), the species which later (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : ² 227. 1834) is the first included under section *Harpostachys* of Trinius. This is followed by *Panicum thrasyoides* and *P. cultratum* (species of *Thrasya*), several species of *Panicum* (in the stricter sense) and of *Echinochloa*; *P. holosericeum* and *P. argenteum*, in which the spikelets are in the reversed position and which are the first species under section *Brachiaria* as later used by Trinius, are here only the seventeenth and eighteenth species under that section. In the "Panicearum Genera" (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3 : ² 194. 1834), which Grisebach cites, Trinius makes *Brachiaria* the eighth section of *Panicum*, *Harpostachys*, to which are relegated the species with a single raceme earlier included in *Brachiaria*, being the seventh. The characters now assigned to *Brachiaria* are: Simple, alternate racemes, the partial axes angled (usually 3-angled); sessile or short-pedicelled, glabrous, pilose, or lanate, awnless spikelets, imbricated in 2, 3, or 4 series. No species is here mentioned, but under "VIII *Brachiaria*" (pages 233-247) this purely artificial division contains thirty diverse species referable to *Brachiaria* (as here limited), *Echinolaena*, and the greater number to *Panicum*. Since there is nothing in either work to indicate which species should be considered the type, it seems best to follow Grisebach's choice when he established *Brachiaria* as a genus. His choice, to be sure, was guided by the fact that *Panicum eruciforme* was the only one of the group which occurred in the Russian Empire, but even so, it would be unwise to reject his type and arbitrarily to choose another. *Panicum eruciforme* is included, under the name "*Panicum Isachne* Roth!" by Trinius in the first subdivision of his section *Brachiaria* as limited in the "Panicearum Genera." Later in the "Graminum Supplementa" (op. cit. 4 : ¹ 103. 1836) he states that *P. Isachne* should be called *Panicum eruciforme*. Trinius' first three species, *P. holosericeum* R. Br., *P. argenteum* R. Br. and *P. serratum* Spreng., are of that peculiar group of Old World species with reversed spikelets clothed with silvery hairs more or less aggregated across the middle of the second glume and sterile lemma, and having a well-developed first glume, which, together with *Leucophrys*, appear to be a connecting link between *Eriochloa* and *Brachiaria*. In the present state of our knowledge it is difficult to say whether these species fall the more naturally into *Brachiaria* or into *Leucophrys*.

Grisebach does not mention the reversed position of the spikelets in *Brachiaria*, and later (Goett. Abh. 7 : 263. 1857) transfers to this genus *Panicum prostratum* Lam. (*P. reptans* L.), a species in which the spikelets are not in the reversed position. In the "Flora of the West Indies" (page 545. 1864) Grisebach uses "*Brachiaria* Tr." as a section of *Panicum*, including under it *Panicum paspaloides* Pers. [*P. geminatum* Forsk. is intended] and three species of *Echinochloa*.

Steudel (Syn. Pl. Glum. 1 : 56. 1854) follows Trinius' own later limitation of the subgenus *Brachiaria*.*

Bentham (Benth. & Hook. Gen. Pl. 3 : 1102. 1883) uses the name *Brachiaria* for a section of *Panicum* and in about the sense equivalent to the group *Geminata* (Hitchc. & Chase, Contr. Nat. Herb. 15 : 30. 1910). Hackel (Engler & Prantl. Pflanzenf. 2 : 235. 1887) also uses it as a section of *Panicum* and apparently in the same way, his diagnosis being: Inflorescence as in *Paspalum*, spikelets awnless.

Nash (Britton, Man. 77. 1901) recognizes *Brachiaria* as a genus (giving Ledebour as the author), differentiating it by the racemose inflorescence and awnless spikelets of 3 glumes. Two species, *Panicum digitarioides* (*P. hemitomon* Schult.) and *P. obtusum* H. B. K., in both of which the spikelets are in the position normal for *Panicum* and *Paspalum*, not the reversed position of *Brachiaria eruciformis*, are transferred to it. Later (in Small, Fl. Southeast. U. S. 50 and 80. 1903) Nash adds to his diagnosis of the genus *Brachiaria* "flowering scale with its opening toward the rachis," thus limiting the genus to Grisebach's type species and its allies. *Panicum digitarioides* and *P. obtusum* he here restores to *Panicum*. Hitchcock (Contr. Nat. Herb. 12 : 141. 1908) accepts *Brachiaria* in this emended sense, separating it from *Panicum* chiefly on account of its "having spikelets so placed that the fertile floret stands with its palea toward the axis."

Milium Bubani, Fl. Pyren. 4 : 259. 1901, not L. 1753. This includes a single species, *M. alternans* Bubani, based on *Panicum eruciforme* Smith. No generic description is given but something of the author's concept of the genus is shown by his statement that it is not possible to separate *Panicum beckmanniaeforme* Mikan (*P. geminatum* Forsk.) from *Milium alternans*, indicating that *Milium* is used in the historic sense. ~~for what we now call Panicum~~

Description.—Inflorescence of several to many ^{usually} dense racemes along a common axis; spikelets solitary, rarely in pairs, subsessile in two rows on one side of a 3-angled, sometimes narrowly winged rachis, the back of the fertile lemma turned from the axis; spikelets dorsally compressed, sometimes turgid; first glume usually less than half the length of the spikelet; second glume and sterile lemma equal or nearly so, 5- to 7-nerved, the lemma enclosing a hyaline palea and sometimes a staminate flower; fruit indurated (in the type species smooth and shining) usually papillose-rugose, the margins of the lemma inrolled, the apex rarely mucronate pointed. Annual or perennial, branching herbs with linear leaves, the culms often decumbent and rooting at the lower nodes, confined to the warmer temperate and tropical regions of both hemispheres.

Brachiaria is here distinguished from allied genera by the strictly racemose inflorescence and reversed position of the spikelets (in which the first glume is present) taken in combination.

*Schlechtendal's stricture (Linnaea 26 : 537. 1853) of Steudel for including under *Panicum* section *Brachiaria* Trin. a different aggregation of species from that included under it by Trinius himself, must have been made in ignorance of Trinius' later paper, for Steudel, not only includes the same species as did Trinius, but gives them in the same order, only interspersing a few of what he considers allied species.

See also

Bub. p. 293

lemma apiculate
or awn tipped, the

5-18

usually
flat dia

Among North American species of *Panicum* two approach *Brachiaria* or *Leucophrys*, *Panicum texanum* Buckl. and *P. ciliatissimum* Buckl., in which the inflorescence is not strictly racemose, but in the first of which the spikelets toward the ends of the branches are often in the reverse position of those of *Brachiaria*, while in the second all the spikelets are in the reverse position. The rugose apiculate fruit of both also recall the fruit of *Eriochloa* and of one species of *Brachiaria*, *B. meziana* Hitchc., but the spikelets are not in one-sided racemes.

14. GENUS AXONOPUS Beauv.

Axonopus Beauv. Ess. Agrost. 12 and 154. 1812. A brief diagnosis is given and the following species cited as belonging to the genus: "*Milium compressum* [*Axonopus compressus* (Swartz) Beauv.], *digitatum* [*Syntherisma digitata* (Swartz) Hitchc.], *cimicinum* [*Panicum cimicinum* (L.) Retz., *Coridochloa cimicina* (L.) Nees], *panicum* [a species of *Syntherisma*]." There is little in the diagnosis or observations to favor one species more than another as the type, but such as there is favors *M. compressum*, since *Axonopus* is differentiated from *Ceresia* and *Paspalum* on the digitate inflorescence and solitary spikelets. All but the first species named have spikelets in pairs. This species, therefore, we take as the type of *Axonopus*. Beauvois himself expresses doubts as to the validity of his genus. He says that if

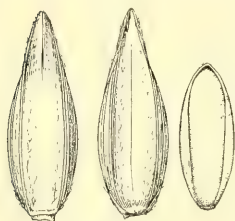


Fig. 6.

Axonopus compressus.

(Two views of spikelet and fruit x 10 diam.)

Milium can be separated from *Paspalum* because the axis of the latter is a spike composed of spikelets alternate or geminate, the same character (*motif*) would serve to distinguish *Axonopus* in which the axis is digitate; at least if one does not reunite the three genera, forming of each a division of the same genus; this, he says, would be perhaps the most natural. But, he adds, "C'est aux Botanists à prononcer: il me suffit de leur présenter mes doutes." Next follows a brief, informal description of a plant received from "M. de Lessert," which, it appears to Beauvois, ought to belong to this genus, with the name of *Axonopus aureus*. In the index (page 154) all five species mentioned are listed under *Axonopus*, but all except "*aureus*" are followed by a question mark. But we find that under *Milium* in the index these same species are again queried. It would seem that the query refers to the author's doubts as to the advisability of keeping *Paspalum* and *Axonopus* distinct from *Milium*. The omission of the question mark after "*aureus*" may be a typographical error. However, we hold *Axonopus compressus* and *A. aureus* to be congeneric, but to belong to two rather well-marked sections.

Cabrera Lag. Gen. & Sp. Nov. 5. 1816. A single species is given under this genus, *C. chrysoblepharis* Lag. "H. in America meridionali, ad Panamaimem et Aricam portum, ubi legit. cel. D. Lud. Néé (V. S.)." The type specimen has not been examined but the clear and detailed descrip-

tion identifies the species with that described as *Paspalum immersum* Nees. In this species and its close allies the 3-angled rachis is about 1.5 mm. wide, the margins and midrib bearing stiff golden hairs arising from papillæ, a few hairs also at the side below the spikelet, but not bearing a fascicle of hairs beneath the spikelet as in *Axonopus aureus*. The spikelets in *Cabrera chrysoblepharis* fit into shallow depressions in the rachis, the effect of an excavation being heightened by the surrounding piliferous papillæ. In *A. aureus*, to which Lagasca's species has been referred by many authors, and its close allies, the narrow rachis is ciliate on the margin (not down the center also as in *Cabrera chrysoblepharis*), and below each spikelet, "in the form of an involucre," as Beauvois says, is a fascicle of bright golden hairs exceeding the spikelets which are not set in excavations of the rachis. Nees (Agrost. Bras. 78. 1829) includes *Axonopus aureus* Beauv. (under the name *Paspalum immersum** to which he refers *A. aureus* as a synonym) and allied species under *Paspalum* "Sectio VI. Axonopodes." Apparently he failed to note that in these species as well as in *Paspalum compressum* and its allies, of which he makes "Sectio I. Digitaliæ," the solitary spikelets are in the reversed position. Nees refers "Gen. Cabrera Lag." to this section *Axonopodes*. Lagasca's species, *C. chrysoblepharis*, he refers as a synonym to his own *Paspalus exasperatus*."

Anastrophus Schlecht. Bot. Zeitschr. 8 : 681. 1850. The author discusses *Paspalum* section *Digitaliæ* "(spiculis inversis)" of Nees and proposes a generic name for it. He lists under this genus the names of eight species, three of them unpublished herbarium names. The first of the species (all of which are included in the section *Digitaliæ* by Nees) is *Paspalum platyculmum* Thou. This species, which we take as the type, was described by Nees (Agrost. Bras. 24. 1829) from a specimen bearing this name in the Willdenow Herbarium. We have not seen the specimen, which was collected in "insula S. Mauritiï," but Nees' description shows it to be closely related to *Axonopus compressus*. Schlechtendal does not himself form any binomials under *Anastrophus*. Index Kewensis (1 : 118. 1893) transfers all names, including nomina nuda, mentioned by Schlechtendal in his paper. Schlechtendal does not here make any mention of *Axonopus*, but in a later paper (Linnaea 26 : 532. 1853), discussing *Axonopus* Beauv., he remarks that he has already established *Anastrophus* and has thereby begun the destruction of the genus *Axonopus* of Beauv., and that now *Cabrera* Lag. must be separated from it. [Since Nees did not mention the reversed position of the spikelets in this group, as he did in the group Schlechtendal named *Anastrophus*, neither does Schlechtendal note this character, although when discussing *Anastrophus* he laid great stress upon it.]

Hackel (Engler & Prantl, Pflanzenf. 2 : 235. 1887) makes *Anastrophus* his third section of *Paspalum*, noting that the lower glume and lemma are turned from the axis. Nash (Small, Fl. Southeast. U. S. 79. 1903) recognizes *Anastrophus* as a genus.

* Nees uses throughout the masculine form of this name.

Lappagopsis Steud. Syn. Pl. Glum. 1 : 112. 1854. This genus is proposed with a single species *L. bijuga* Steud. "Urville legit in Ins. St. Catharin. et Claussen in Brasil." The Claussen specimen referred to is in the Kew Herbarium. It is found to be closely related to *Paspalum dissitiflorum* Trin., which species Nees (Agrost. Bras. 32. 1829) includes in his section "Digitariae (speculis inversis)." Hackel (Engler & Prantl. Pflanzenf. 2 : 255. 1887, where the name is misspelled "*Lappagrostis*") includes it in section *Anastrophus*.

Owing to its insufficient diagnosis and the diverse species assigned to *Anoxopus* by Beauvois this name has been applied to different groups of species by different authors. Roemer & Schultes (Syst. Veg. 2 : 318. 1817) recognize it as a genus including under it the same species as did Beauvois except *A. paniceus* which, they say, is *Paspalum filiforme* [it is a species allied to *Syntherisma filiformis*]. Nees, as we have seen, used it as a section of *Paspalum* for the species allied to *A. aureus*. Hooker (Fl. Brit. Ind. 7 : 64. 1896) says of *Axonopus* "A natural genus, remarkable for the small cleft palea of gl. III [the sterile palea]. It was established by Beauvois on *Panicum cimicinum* Retz, to which other grasses having no affinity with it were added." Hooker does not state why he takes *P. cimicinum* as the basis of *Axonopus*. It fails to agree with one of the two characters of Beauvois' diagnosis (in that its spikelets are not solitary), and it is only third in the list. Hooker here includes one other species in this genus, *A. semialatus* (based on *Panicum semialatum* R. Br.) Stapf (Dyer, Fl. Cap. 7 : 418. 1898) accepts the genus as emended by Hooker. Hitchcock (Rhodora 8 : 205. 1906; Contr. Nat. Herb. 12 : 141. 1908; Gray, Man. ed. 7. 100. 1908; Contr. Nat. Herb. 12 : 207. 1909.) recognizes *Axonopus* for the congeners of *A. compressus*.

Description.—Inflorescence of 2 to many slender racemes usually aggregated at the summit of the culm; spikelets solitary, sessile and alternate in two rows on one side of a 3-angled rachis, the back of the fertile lemma turned from the axis; spikelets depressed-biconvex, not turgid; first glume wanting; second glume and sterile lemma equal; sterile palea obsolete; fruit indurated, oblong-elliptic, usually obtuse, the margins of the lemma slightly inrolled. Stoloniferous or tufted perennials, with flat, conduplicate or involute, linear leaves; species numerous in South America, a few species extending into subtropical and warm temperate regions of North America and one or two to the warmer parts of the Old World.

The characters to which we here attach chief value as generic are the reversed and solitary spikelets (in which the first glume is wanting) and the racemes aggregated at the summit of the culm.

The genus *Axonopus* as here understood, subdivides into three rather well-marked sections as follows:

- Rachis and spikelets glabrous or the latter softly pubescent, neither bearing conspicuous, stiff, spreading hairs *AXONOPUS* proper.
- Rachis and sometimes spikelets bearing conspicuous, stiff, spreading hairs.

Spikelets glabrous or minutely pubescent, the hairs of
the rachis golden Section CABRERA.
Spikelets papillose-pilose, the hairs of these and of the
rachis pale Section LAPPAGOPSIS.

In North America *Axonopus* proper is represented by the following species:

***Axonopus compressus* (Sw.) Beauv.**

Milium compressum Sw. Prod. Veg. Ind. Occ. 24. 1788. "Jamaica; India occidentalis." No specimen of this could be found in the Swartz Herbarium, but the later detailed description of Swartz (Fl. Ind. Occ. 1 : 183. 1797) leaves no room for doubt.

Paspalum platycaulon Poir. Encyc. Suppl. 5 : 34. 1804. "Cette espèce a été recueillie à Porto-Ricco, par le citoyen Ledru. (V. s. in herb. Lam.)." The type has not been examined but the description identifies the species.

Axonopus compressus Beauv. Ess. Agrost. 12. 1812. Based on *Milium compressum* Sw.

Paspalum compressum Rasp. Ann. Sci. Nat. I. 5 : 301. 1825. Based on *Axonopus compressus* Beauv.

Anastrophus platycaulis Schlecht.; Ind. Kew. 1 : 118. 1893. Based on *Paspalum platycaule*.

Closely related to this species is a narrower-leaved form with nearly obtuse spikelets and usually few racemes which may be (*Paspalum tri-*
stachyon Lam. (Tabl. Encycl. I : 176. 1791. "Ex America merid. Com-
munic. D. Richard"). This name has been referred by Trinius and
others to *P. platycaule*, but Lamarck's description "spicis ternis" points
to the other form. The type has not been examined.

***Axonopus furcatus* (Flügge) Hitchc.**

Paspalum furcatum Flügge, Gram. Monog. 114. 1810. "Carolina. Bosc. Waln." The type has not been examined, but the description identifies the species.

Paspalum digitalia C. Muell. Bot. Zeit. 19 : 324. 1861. "America septentrionalis, ubi forsan in Texas legit T. Drummond (coll. no. 276)." The type specimen was examined in the Berlin Herbarium.

Axonopus furcatus Hitchc. Rhodora 8 : 205. 1906.

Michaux's name *Digitalia paspalodes* and several names based upon it, *Milium paspalodes* Ell., *Paspalum elliottii* Wats., *Paspalum paspalodes* Scribn., and *Anastrophus paspaloides* Nash, have been misapplied to this species. Michaux's type specimen is *Paspalum distichum* L.*

***Axonopus Rosei* (Scribn. & Merr.).**

Paspalum Rosei Scribn. & Merr. U. S. Dept. Agr. Div. Agrost. Bull. 21 : 9. f. 2. 1900. "Foothills of the Sierra Madre Mountains, between

* See Hitchcock, Contr. Nat. Herb. 12 : 146. 1908.

= *A. compressus*
See Lam. Encycl.

Pedro Paulo and San Blascito, 1995 J. N. Rose, August 4, 1897." The type specimen is in the National Herbarium.

Axonopus capillaris (Lam.).

Paspalum capillare Lam. Tabl. Encycl. 1 : 176. 1791. "Ex America merid. Comm. D. Richard."

Paspalum minutum Trin. (Linnaea 10 : 293. 1836), the type of which, collected by Poeppig in Peru, was examined in the Trinius Herbarium, appears to be based on depauperate specimens of *A. capillaris*.

The only North American specimens we have seen of this species are from Costa Rica, *Pittier* 508 and *Jimenez* 146.

Axonopus laxiflorus (Trin.).

Paspalum laxiflorum Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3² : 148. 1834. "V. spp. Bras." The type specimen, in the Trinius Herbarium, is labeled "Paspalum laxiflorum m. In saxosis pratisque humidis S. da Lapa. Langsdorff."

This species is represented from North America in the National Herbarium by *Pittier* 214, Alta Verapaz, Guatemala, and *Nelson* 2738, collected between Guichocovi and Lagunas, Oaxaca, Mexico.

dislased
unidentifi-
able

Axonopus poiophyllus sp. nov.

Plants perennial, tufted, flattened at the base; culms erect, slender, compressed, 60 to 90 cm. high, simple, glabrous or minutely scabrous below the appressed-pubescent nodes, the leaves mostly crowded at the base; lower sheaths much overlapping, keeled, villous, the upper pubescent along the margin, otherwise glabrous or minutely pubescent; ligule scarcely 0.5 mm. long, erose-ciliate; blades erect, firm, linear, 8 to 35 cm. long (the uppermost reduced to 0.5 to 2 cm. long), 3 to 5 mm. wide, the apex boat-shaped as in *Poa*, the lower conduplicate at base and slightly narrower than the summit of the sheaths, usually flat above, papillose-villous toward the base on both surfaces, scabrous on the upper surface; inflorescence of about 3 slender, erect racemes, 6 to 12 cm. long, the rachis narrow, flexuous, glabrous or minutely scabrous; spikelets tinged with rose-purple, distant their own length, 3 mm. long, 1 mm. wide, oblong-elliptic, subacute, the second glume and sterile lemma slightly exceeding the fruit, minutely pubescent at the base and along the edges with appressed silky hairs, 4-nerved, the midnerve suppressed or nearly so, especially that of the glume, the lateral nerves near the margins and approximate; fruit pale, very obscurely papillose, the lemma with a minute tuft of erect hairs at the apex.

Type U. S. National Herbarium no. 860024, collected in April, 1904, in the vicinity of Secanquím, Alta Verapaz, Guatemala, by O. F. Cook & C. B. Doyle (no. 58).

This species is related to the group of cespitose South American species to which *A. laxiflorus* also belongs.

Axonopus deludens sp. nov.

Plants perennial; culms geniculate at base, leafy, strongly flattened, rather stout, 1 to 1.5 meters high, sparingly branching, glabrous, the nodes glabrous; sheaths glabrous or minutely pubescent at the summit; ligule about 0.5 mm. long, membranaceous, erose; blades rather thin and lax, linear, 15 to 45 cm. long, 8 to 13 mm. wide, flat, sparsely papillose-scabrous on the upper surface and on the margin, pubescent on the narrow auricles, glabrous beneath, the midnerve prominent; inflorescence of 6 to 15 very slender, erect or rather lax racemes, 10 to 25 cm. long, the lower mostly naked at the base, the rachis narrow, subflexuous, scabrous; spikelets purple tinged, distant about their own length or, toward the base of the raceme, remote, 3 to 3.2 mm. long, 1 to 1.2 mm. wide, obtuse, glabrous, the second glume and sterile lemma covering the fruit but not exceeding it, delicate in texture, 4- or 5-nerved, the midnerve present or suppressed even in adjacent spikelets, the lateral nerves strong; fruit papillose, smooth toward the summit and margins of the lemma, the apex glabrous or with a few obscure hairs.

Type U. S. National Herbarium no. 460803, collected Oct. 20, 1903, Barranca near Guadalajara, Jalisco, Mexico, by C. G. Pringle (no. 8761).

This species is not closely related to any other we have seen. The geniculate lower nodes suggest a stoloniferous habit, but our one specimen does not show stolons. The suppression of the midnerve in the glume or its presence is somewhat confusing, since it gives the impression of spikelets turned different ways, reverse and obverse, but turning back the glume always shows the back of the fertile lemma turned from the axis.

There are some eight or ten South American species, as yet insufficiently known, that belong in *Axonopus* proper. *Paspalum suffultum* Mikan (Trin. in Spreng. Neu. Entd. 2 : 46. 1821) is interesting as a species intermediate between *Axonopus* proper and section *Cabrera*. The axis is not ciliate but the very short pedicels bear at either side a few stiff hairs nearly as long as the spikelets.

Section *CABRERA* (Lag.).**Axonopus chrysoblepharis** (Lag.).

Cabrera chrysoblepharis Lag. Gen. & Sp. Nov. 5. 1816. (See above under *Cabrera*.)

Paspalum immersus Nees, Agrost. Bras. 82. 1829. "Habitat in campis ultra 2000 pedes altis provinciae Minarum generalium passim." The type specimen was examined in the Munich Herbarium. This is, as Nees indicates, the species Kunth called *Paspalum aureum*, but since Kunth based this name on *Axonopus aureus* Beauv., his name is a synonym of that, misapplied to this species.

Panicum immersum Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3² : 197. 1834. Based on *Paspalum immersum* Nees.

Panicum chrysoblephare Steud. Syn. Pl. Glum. 1 : 38. 1854. Based on *Cabrera chrysoblepharis* Lag.

Paspalum chrysoblephare Doell in Mart. Fl. Bras. 2² : 119. 1877. Based on *Panicum chrysoblephare* Steud.

The North American specimens of this species in the National Herbarium are all from Costa Rica: *Herb. Instit. physico-geogr. nat. costaricensis* no. 4464, collected in "Savanes de Boruca," by Pittier & Tonduz and no. 4638, collected between Boruca and Terraba, by Pittier; no. 11004 of the same series, collected by Pittier, is a mixture of *A. chrysoblepharis* and *A. aureus*.

Axonopus aureus Beauv.

Axonopus aureus Beauv. Ess. Agrost. 12. 1812. Beauvois states that the plant was given him by De Lessert, but does not say whence it came. The specimen could not be found in the Delessert Herbarium. The author's observation "Locustes [spikelets] sont garnies, en-dessous, et en forme d'involucre, de poils court et dorés", points conclusively to one of the species with a cluster of golden hairs subtending the spikelets, these having a narrow rachis, not a broad one in which the spikelets are sunken as in *A. chrysoblepharis*. Following Trinius (Icon. 1: pl. 97. 1828) we take the common species with the smaller and glabrous spikelets to be the true *A. aureus*. The one with larger, pubescent spikelets, *Paspalum canescens* Nees (in Trin. Gram. Pan. 89. 1826, not Roth. 1821, *Panicum chrysodactylon* Trin.), the type of which was examined in the Trinius Herbarium, has not been found in North America and for the present need not be transferred. The species of this group extending into North America is that called *Paspalum aureum* by Trinius.

Paspalum aureum H. B. K. Nov. Gen. & Sp. 1 : 93. 1816. Based on "Axonopus [misspelled *Axonopus*] aureus Beauv. agrost. p. 12." The species described and illustrated by Kunth (l. c. pl. 27) is *A. chrysoblepharis*.

Digitaria aurea Spreng. Syst. 1 : 272. 1825. Based on "*Paspalum aureum* Humb."

Paspalum exasperatum Nees, Agrost. Bras. 81. 1829. "Habitat ad margines sylvarum prope Ferradas provinciae Bahiensis, in via Felisbertiana, quae descendit e Minis." The type specimen was examined in the Munich Herbarium.

Panicum aureum Trin. Mém. Acad. St. Pétersb. VI. 3² : 196. 1834. Based on "*P[aspalum] aureum* Trin."

In North America this species also is known only from Costa Rica. In the National Herbarium are the following: *Herb. instit. physico-geogr. nat. costaricensis* no. 3305, collected at Pacaca, by Pittier; no. 3683, collected at Buenos Aires by Tonduz; nos. 11003 and 11004, collected at Cañas Gordas by Pittier, the latter having an intermixture of *A. chrysoblepharis*.

A. S. H. 7987
Panama

Section LAPPAGOPSIS (Steud.).

Axonopus dissitiflorus (Trin.).

Paspalum dissitiflorum Trin. Gram. Pan. 92. 1826. "V. spp. Brasil. (LANGSDORFF.)" The type specimen was examined in the Trinius Herbarium.

Eriochloa brasiliensis Spr. = this ex descr.

Chenman refers specimen of this to *Pasp. brasiliense*.

Paspalus tener Nees, Agrost. Bras. 32. 1829. This herbarium name is given as a synonym of *P. dissitiflorum* Trin.

This species is represented in the National Herbarium by Glaziov 15637, from Brazil.

Axonopus bijugus (Stend.).

Lappagopsis bijuga Stend. Syn. Pl. Glum. 1: 112. 1854. (See above under *Lappagopsis*.)

This more delicate species with smaller spikelets is represented in the National Herbarium by the following, all from Brazil: *Burchell* 5886, 7703; *Gardner* 2978.

Two species described by Nees, *Paspalum canaliculatum* and *P. fastigiatum*, the types of which, both collected by Martius in Brazil, were examined in the Munich Herbarium, belong in this section but being insufficiently known are not here transferred.

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15. GENUS REIMAROCHLOA Hitchc.

Reimarochloa Hitchc. Contr. Nat. Herb. 12: 198. 1909. "For *R[eimaria]* *acuta* and its allied species the above name is proposed with *Reimaria acuta* Flüggé as the type: *Reimarochloa acuta* (Flüggé)" Hitchc.

Besides the type, two other species are here included in this genus, *Reimarochloa brasiliensis* (Spreng.) Hitchc. and *Reimarochloa oligostachya* (Munro) Hitchc. For the discussion of *Reimaria* Flüggé see this name under *Paspalum*.

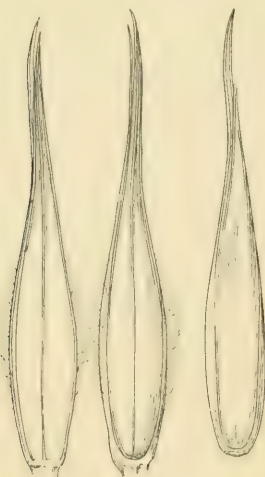


Fig. 7.
Reimarochloa acuta.
(Two views of spikelet and fruit
x 10 diam.)

Description.—Inflorescence of few to several slender racemes, approximate at the summit of the culm, spreading or reflexed at maturity; spikelets strongly dorsally compressed, lanceolate, acuminate, solitary, rather distant, subsessile and alternate in two rows along one side of a narrow, flattened rachis, the back of the fertile lemma turned toward it; both glumes wanting (or the second glume sometimes present in the terminal spikelet); sterile lemma about equaling the fruit, sterile palea obsolete; fruit scarcely indurated, the lemma faintly nerved, acuminate, the margins inrolled at the base only, the palea free nearly half its length. Stolonerous perennials with

linear leaves; a small genus of but few species confined to the tropics and subtropics of the western hemisphere.

The scarcely indurated, acuminate fruit, the margins of the lemma inrolled at the base only, the palea free for its upper half, and the absence of the glumes, taken in combination, together with the spreading or

Dichromis Schlecht. Bot Zeit. 10: 15-17. 1852.
"Dichromis elegans Flüggé aut *Reimaria* (*Paspalum pulchellum* H.B.K. ex Flüggé 1810)" type no description

reflexed racemes approximate at the summit of the culm, are here taken as the distinguishing characters of this genus.

Besides the species placed in this genus by Hitchcock (l. c.) a third South American species belongs in the genus, *Reimarochloa aberrans* (Doell), *Reimaria aberrans* Doell (Mart. Fl. Bras. 2²: 38. pl. 13. 1877) "Habitat prope Santarem provinciæ Paraënsis (R. Spruce n. 851 et 887.)" The type specimen, *Spruce* 851, was examined in the Munich Herbarium. In this species the second glume is occasionally present on racemes with glumeless spikelets.

16. GENUS PASPALUM L.

Paspalum L. Syst. Nat. ed. 10. 855. 1759. After a brief diagnosis four species are given, *P. dimidiatum*, *P. virgatum*, *P. paniculatum* and *P. distichum*. All agree with the diagnosis, though the last, with acute fruit, might be excluded from eligibility as type species because the generic diagnosis reads: "Cor. Gluma * * * obtusa." None of the species are figured in the same work, none are economic nor indigenous from the standpoint of the author. *Paspalum virgatum* and *P. paniculatum* are here first published, *P. dimidiatum* being the only one previously described. For this reason and also because it is the first species under the genus it is here taken as the type. This is given as follows: "*dimidiatum* A [*aspalum*] spicis subsolitariis, pedunculo communi membranaceo. *Panicum dissectum* sp. pl. 57. n. 6." There is nothing to explain why Linnaeus changed the specific name. This is discussed by Hitchcock (Contr. Nat. Herb. 12: 115-116. 1908) who examined in the Linnaean Herbarium the type specimen, upon the sheet of which Linnaeus wrote both "*dimidiatum*", which is crossed out, and "*dissectum*." The plant is also marked "K" which indicates that it was collected by Kalm. In the second edition of the Species Plantarum (page 81. 1762) Linnaeus corrects himself, giving the name *Paspalum dissectum* L. based

upon "*Panicum dissectum* Sp. pl. 1. p. 57." (For a full discussion the reader is referred to Hitchcock's paper.) The specimen belongs to the species long known under the name *Paspalum membranaceum* Walt.

The masculine form *Paspalus* was used by Flügel (Gram. Monog. 51-190. 1810) Roemer and Schultes (Syst. Veg. 2: 290-317. 1817) and by Nees (Agrost. Bras. 18-82. 1829).

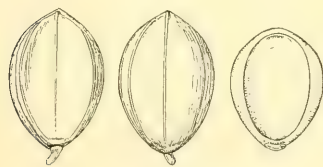


Fig. 8.

Paspalum dissectum.

(Two views of spikelet and fruit
x 10 diam.)

Digitaria Heist. in Fabr. Enum. Pl. Hort. Helm. 207. 1759. This name is given as follows: "*Digitaria* Heist. *Dactylis* Rai. *Gramen dactylon majus panicula longa, spicis pluribus nudis crassis*. Sloane." This phrase name in Sloane (Voy. Jam. 1: 112. pl. 69. f. 2. 1707) refers to the species later published as *Paspalum virgatum* L., Sloane's specimen of which was examined in the herbarium of the British Museum. This phrase

name Linnaeus first cites (as the third synonym) under *Panicum dissectum* (Sp. Pl. 57. 1753), but erroneously, the plate being an illustration of a very different species from the type of *P. dissectum* in the Linnaean Herbarium.* Linnaeus later (Sp. Pl. ed. 2. 81. 1762) cites this phrase name and plate under *Paspalum virgatum* and also (op. cit. 1483), erroneously, under *Andropogon fasciculatum*. According to the American Code of Botanical Nomenclature (Canon 10) the publication of *Digitaria* Heist. as a genus would depend upon the specific description [from Sloane] "associable by citation with a previously published binomial species." While this specific description is cited under *Panicum dissectum* it is erroneously so; the species to which the description (as well as the figure) applies has no "previously published binomial," and therefore in the technical sense is not published.

Salsab Adans. Fam. 2: 31, 599. 1763. No species are given. The technical publication of the name is based upon the citation of "*Paspalum*. Lin."

Cleachne Roland. in Rottb. Acta Lit. Univ. Hafn. 1: 285. 1778. The name "*Cleachne* R." appears to be given as a synonym of *Paspalum*, three unpublished names of the latter being mentioned without description.

Ceresia Pers. Syn. Pl. 1: 85. 1805. A brief diagnosis is given and a single species *C. elegans* Pers. (t. e.) is cited. This name is based on "*Paspalum membranaceum* Lam. ill. gen. p. 177. t. 43. f. 2. Hab. in Peru." The generic diagnosis appears to be taken from Lamarck's specific description, but slightly rearranged. Lamarck's specimen has not been examined, but the description and figure indicate one of the species related to *Paspalum stellatum* Humb. & Bonpl. and probably that represented by Gardner's Plants of Brazil no. 4029 and Bang's Plantae Bolivianae no. 1080. Lamarck's name is preoccupied by Walter's use of *P. membranaceum*. Roemer & Schultes (Syst. Veg. 2: 290. 1817) give *P. elegans*, based on *Ceresia elegans* Pers., as a synonym of *P. membranaceum* Lam., but this binomial also is preoccupied by *P. elegans* Flügge (Gram. Monog. 183. 1810); *P. commersonii* Zucc. (in Roem. Collect. 122. 1809), which appears to refer to this species, is preoccupied by Lamarck's use of the same name. It seems probable that this species has somewhere received a name that will prove tenable, but as yet we have not found it. Trinius and Doell use the name *P. membranaceum* Lam.

Reimaria Flügge. Gram. Monog. 213. 1810. The "character essentialis" given is as follows: "*Calix* uniglumis, unifloris, valvae planiori appressus. *Corolla* plano-convexa, bivalvis," to which is added the observation "*Paspalo* affinis, at satis superque differt calice constanter uniglumi nec biglumi." It will be seen that the absence of both glumes is the only character given to differentiate this proposed genus from *Paspalum*. Three species are included, *R. candida* Humb. & Bonpl., *R. elegans* and *R. acuta*, all here described for the first time. The first

* For an account of the types of American grasses described by Linnaeus see Hitchcock (Contr. Nat. Herb. 12: 114-127. 1908).

two are species of *Paspalum* in which both glumes are wanting, the third has characters sufficiently distinct to be referred to a different genus. (See *Reimarochloa* Hitchc., of which *R. acuta* is the type.) Since the three species cited belong to two genera, it is necessary that the name *Reimaria* go with the larger group. (See Hitchcock, Contr. Nat. Herb. 12 : 198. 1909.) Of these two species we take the first as the type species. This was described from a plant collected "Prope Puanbo in America meridionali. Humboldt et Bonpland." Flüge gives "Humboldt et Bonpland" as the authors of the species. Kunth later (Mem. Mus. Par. 2 : 68. 1815) transferred the specific name to *Paspalum*. A part of the type or a duplicate of it marked "ex Hb. Kunth & Hb. Humb." was examined in the Berlin Herbarium. It is the species distributed as *Paspalum candidum* H. B. K. by John Donnell Smith and by the Herb. Instit. physico-geogr. nat. costaricensis, and represented in the National Herbarium by John Donnell Smith 4992, Tonduz 8492 and several others collections from Costa Rica and Guatemala. Doell (Mart. Fl. Bras. 2² : 39. 1877) proposes a section *Eremachyrion* for the species of *Paspalum* in which both glumes are wanting.

Paspalanthium Desv. Opusc. 59. 1831. This genus, which is differentiated from *Paspalum* by the loose glume and sterile lemma exceeding the fruit and by the membranaceous rachis, includes a single species *P. stoloniferum* Desv., based on *Paspalum stoloniferum* Bosc. (Trans. Linn. Soc. 2 : 83. pl. 16. 1794 "H. in Perua"). The type specimen was examined in the Bosc Herbarium at Padua. It is the species frequently cultivated under this name, with thin, conspicuously rugose sterile lemma. = *Tasp. racemosum* Lam.

Moenchia Wender in Steud. Nom. Bot. ed. 2. 2 : 153. 1841, not Roth. 1788. There is no description and a single nomen nudum, *M. speciosa* Wender, is given as a synonym of *Panicum saccharoides* Kunth, upon which is based *Paspalum saccharoides* Nees.

Anachyris Nees, in Hook. Kew Journ. 2 : 103. 1850. A single species, *A. paspaloides* Nees "In Brasilia. Gardner, n. 4031 in herb. Lindl.," is included. A portion of a raceme from the type specimen was kindly sent by the herbarium at the University of Cambridge for deposit in the National Herbarium. The species is of that small group including *Paspalum malacophyllum* Trin. and *P. elongatum* Griseb., in which both glumes are wanting and in which the very convex fertile lemma is longitudinally grooved. This accounts for the mistake made by Nees in placing the proposed genus in *Oryzææ*. In this group the fruit is rather readily detached from the spikelet leaving the thin sterile lemma attached to the rachis. It must have been such a fruit, mistaken for the entire spikelet, that Nees had before him when he described the genus.

Steudel (Syn. Pl. Glum. 1 : 33. 1854) spells this name *Anachyrism*.

Maizilla Schlecht. Bot. Zeit. 8 : 601, 605. 1850. A single species is given, "*M. stolonifera* Bosc. sub *Paspalo*."

Cymatochloa Schlecht. Bot. Zeit. 12 : 817, 821. 1854. Two species, "*C. fluitans* N[on]b. (*Ceresia fluitans* Ell. * * *)" and "*C. repens*

Syllepsis town.
on same type

Nb. (*Paspalum repens* Berg.)," are included, the first of which is here taken as the type.

Dimorphostachys Fourn. Compt. Rend. Acad. Sci. Paris. 80 : 441. 1875. This genus is proposed because of the presence of the first glume of the spikelet, this glume in the lower of the pair of spikelets being larger than in the upper. The author says the group contains eleven species, but four of which he mentions, *Panicum monostachyum* H. B. K., *Paspalum pilosum* Lam., *Paspalum oajacense* Steud., and *Paspalum pedunculatum* Poir. Fournier does not here actually transfer any species to *Dimorphostachys*. His first named species, which we take as the type, was, together with the others given in his posthumous work (Mex. Pl. 2 : 14-16. 1886*), published under this genus by Hemsley (Biol. Centr. Amer. Bot. 3 : 499. 1885), as *D. monostachya* Fourn., based on *Panicum monostachyum* H. B. K.

The section *Harpotachys* of *Panicum* established by Trinius (Mém. Acad. Pétersb. VI. Sci. Nat. 3² : 227. 1834) for species having a simple, solitary raceme, if typified by the first group of species included in it, *Panicum decumbens* Roem. & Schult. (based on *Paspalum decumbens* Sw., of which *P. pedunculatum* Poir. is a synonym) and *Panicum monostachyum* H. B. K., is synonymous with *Dimorphostachys*. In this section, however, Trinius included a number of remote species, the wholly artificial character on which it is based bringing together, besides the two species of *Paspalum* mentioned above, *Thrasya paspaloides* H. B. K. and congeners; *Panicum repandum* Nees, a species related to *P. obtusum* H. B. K., *Echinolaena hirta*, and *Panicum sclerochloa* Trin. and other species referable to *Mesosetum*.

Wirtgenia Nees; Doell in Mart. Fl. Bras. 2² : 40. 1877. "*Wirtgenia paspaloides* Nees ab Esenb. in herb. Reg. Berlin.", a herbarium name for the species Nees published as *Anachyris paspaloides*, is here given as a synonym of *Paspalum malacophyllum* Trin.

The relationship of the various species upon which are based the proposed genera here included as synonyms of *Paspalum* together with the history of these groups will be discussed in the projected revision of North American species of *Paspalum*.

Description.—Inflorescence of 1 to numerous, simple, spike-like racemes, along a common axis; spikelets plano-convex, usually obtuse, sessile (rarely on pedicels as long as the spikelets) solitary or in pairs, in two rows on one side of a narrow or dilated rachis, the back of the fertile lemma turned toward it;† first glume typically wanting (regularly present in a few species, occasionally present in others; in a few species both glumes wanting); second glume and sterile lemma subequal, the glume rarely shorter; fruit usually obtuse, the lemma and palea chartaceous-indurated (rarely but slightly so), the margins of the lemma inrolled.

* For discussion of date of this work see Hitchcock & Chase, Contr. Nat. Herb. 15 : 49. 1910.

† Owing to a torsion of the short pedicels the crowded, paired spikelets are often turned edgewise to the rachis or even entirely reversed, but in all species examined the spikelet is attached with the back of its fertile lemma toward the rachis.

Syllép's Journ.
Mex. Fl. 2: 52.
1886

Mostly perennials, of various habit; a large genus of the tropics and warm temperate regions of both hemispheres, but the species much more numerous in the western hemisphere.

The characters here considered as of chief generic value are the strictly racemose inflorescence, the plano-convex (sometimes slightly concavo-convex) spikelets in which the first glume is wanting, and the obtuse, indurated fruit, the margins of the lemma inrolled, taken in combination. But in this large, on the whole well-marked genus, there are many species which depart more or less from some one or two of these characters.

17. GENUS PANICUM L.

Panicum L. Sp. Pl. 55. 1753. This genus is discussed by Hitchcock & Chase (Contr. Nat. Herb. 15: 11-18. 1910) and the type species shown to be *Panicum miliaceum* L. The generic names included as synonyms

under *Panicum*, so far as these are based on North American species, are there accounted for. The genus in relation to the South American and Old World species upon which genera have been proposed will be discussed in a later paper. In the above mentioned work, under the genera excluded

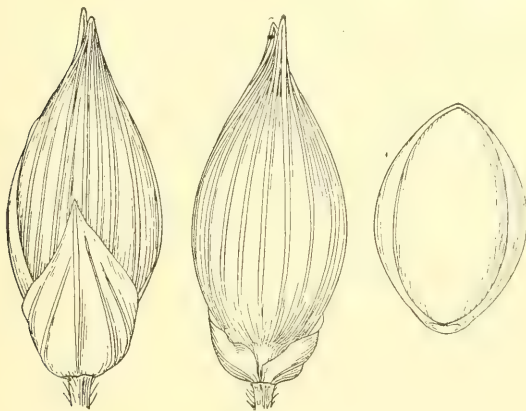


Fig. 9.

Panicum miliaceum.

(Two views of spikelet and fruit $\times 10$ diam.)

from *Panicum* (op. cit. 16), is given *Panicum tuerckheimii* Hack., "an anomalous species with spikelets in which the first glume is wholly wanting, and in which no rudiment of a palea is found in the sterile lemma." This statement is found to be partly erroneous. There is present a small hyaline first glume, so transparent as to be invisible in the dry spikelet, which escaped the notice of Hackel and of ourselves. This species, though unique, we now include in the genus *Panicum*. It will be described and the spikelet figured in a forthcoming paper (by Hitchcock & Chase) on the Mexican and Central American species of *Panicum*, a supplement to the recent revision of the genus.

Chasea Nieuwl. Amer. Midl. Nat. 2: 63, 64. 1911. This name is proposed as "nov. nom. *Panicum* of the authors not of Linnaeus or only

in part." The author states that he "restores" the "name *Panicum* to the group of plants to which it was applied as far back as nearly two thousand years ago," overlooking Bubani's restoration of the same name to the same group in 1901 (Fl. Pyren. 4 : 261) and the fact that Adanson, Miller and Moench, applied the name *Panicum* in the same way. As shown in the revision of North American Species of *Panicum* (Hitchcock & Chase, Contr. Nat. Herb. 15 : 13. 1910) "the historic type species of *Panicum* is *Chaetochloa italica*", and the pre-Linnæan name for the genus containing *Panicum miliaceum* is *Milium*. Nieuwland, while maintaining *Panicum* for the pre-Linnæan genus of this name, overlooks *Milium* Tourn., the historic name of the genus containing *Panicum miliaceum*, and also the post-Linnæan *Urochloa* Beauv. (Ess. Agrost. 52. pl. 11. f. 1. 1812.) based on *U. panicoides* Beauv., which is the same as *Panicum helopus* Trin., an Old World species of the *Fasciculata* group of *Panicum*; *Thalassium* Spreng. (Syst. Veg. 4 : cur. post. 30. 1827), based on a South American species allied to *Panicum urvilleanum* Kunth; *Steinichisma** Raf. 1827; *Eriolytrum* Desv. in Kunth (Rév. Gram. 2 : 217. 1830), based on a South American specimen of *P. urvilleanum* or an allied species; and *Phanopyrum* Nash. The author (op. cit. 61) states that the "other group [*Panicum* L. excluding *Panicum italicum* and its congeners] has never to my knowledge received a name," and (op. cit. 63) that "This procedure leaves the other genus hitherto called *Panicum* by the authors, without a name, as far as I am able to ascertain, and I propose that of Chasea." Since this is proposed as a new name for "*Panicum* of the authors" and no particular authors are mentioned,† we take it as based upon *Panicum* as used by Beauvois (Ess. Agrost. 45, 169, 170, 171. 1812) who, besides recognizing *Paspalum* L., *Digitaria* Hall., *Cynodon* and *Pennisetum* Pers., segregates *Setaria* and *Echinochloa*, leaving in *Panicum* the remainder of the species included by Linnaeus under that genus, that is the group of *Panicum miliaceum* and its congeners.

18. GENUS ICHNANTHUS Beauv.

Ichnanthus Beauv. Ess. Agrost. 56. pl. 12. f. 1. 1812. The genus is based on a single species, *I. panicoides* Beauv. (op. cit. 57), "croît dans l'Amérique méridionale: elle m'a été communiquée par M. DESFONTAINES." The generic description is erroneous in that Beauvois mistook the appendages at the base of the fruit for an abortive floret placed, he says, contrariwise to the other florets. (It was from this supposed abortive floret that Beauvois derived the name *Ichnanthus*.) We have not seen Beauvois' specimen. The figure, though slightly inaccurate, is a good illustration of the species well described and figured by Kunth (Rév. Gram. 2 : 245. pl. 34. 1830) under the name *Ichnanthus panicoides*.

* This and *Phanopyrum* are discussed in Contr. Nat. Herb. 15 : 18, 118, 327. 1910.

† It might be inferred from the name proposed that Hitchcock and Chase, authors of the North American Species of *Panicum*, were referred to, but this work is nowhere mentioned by Nieuwland, nor is the source of the proposed name given.

Navicularia Raddi, Agrost. Bras. 38. pl. 1. f. 5. 1823. Three species are included, *N. hirta*, *N. glabra* and *N. lanata* (op. cit. 40. pl. 1. f. 5). The last-named species, "Invenitur in herbis prope Rio-Inhumirim", is



Fig. 10.
Ichnanthus panicoides.
(Spikelet and fruit $\times 7\frac{1}{2}$ diam.)

here taken as the type since it is the only one of the three figured in the same work and because Raddi, in his generic description, refers to this figure. We have not seen Raddi's specimen, but from the description and figure we judge it to be the same as *Panicum leiocarpum* Spreng. (*Ichnanthus leiocarpus* (Spreng.) Kunth), to which Nees (Agrost. Bras. 147. 1829) refers it, or a closely allied species. Raddi proposes the genus because of the peculiar calyx-like structure which is borne on the hermaphrodite floret.

The genus *Ichnanthus* has been recognized by some authors as valid and by others has been included in *Panicum*. Trinius at first (Fund. Agrost. 130. 1820) accepts *Ichnanthus*, even to the "transverse" abortive floret, but later (Gram. Pan. 52, 53. 1826) he includes it in his *Panicum*, section *Jubaria*, with the observation that it is included in *Panicum*,

having, like "*Pan. almadense*, *pseudagrostis*, *Hofmannseggii*, *melicarium*", a hermaphrodite floret appendiculate at the base with a double rudiment.

Nees (Agrost. Bras. 149. 1829) includes *Ichnanthus panicoides*, which he here renames *Panicum ichnanthum*, in *Panicum*, section *Virgata*, placing it next after *Panicum leiocarpum* and *P. Hoffmannseggii*, species now recognized as belonging in *Ichnanthus*. Nees describes the perfect floret as being embraced at the base by an ovate, appressed, papery, two-parted lamina.

Kunth (Rév. Gram. 1 : 41. 1829) accepts the genus *Ichnanthus* with the single original species, and describes the fertile lemma as bearing at the base oblique-oblong, obtuse, glabrous scales decurrent on the pedicel. Later (op. cit. 2 : 245. 1830), while still including but the single species, Kunth, in his observations, states that the supposed hypogynous scales of authors are analogous to the lodicules which are ordinarily found only at the base of the interior palet (palea) but are here found also and greatly developed, on the exterior palet (lemma). In a later part of the same work (op. cit. 2 : 508. pl. 168. 1831) he transfers to *Ichnanthus* *Panicum leiocarpum* Spreng., a species in which the appendages are prominent. Still maintaining the genus solely on account of the appendages at the base of the perfect floret, Kunth (Enum. Pl. 1 : 135. 1833) adds *Panicum almadense* Nees to *Ichnanthus*.

Trinius (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3² : 195, 320. 1834) makes *Ichnanthus* (spelling it "*Ichnantus*") a section of *Panicum*, with the synoptical heading "Flosculus * * * hermaphroditus basi faciei utrinque canaliculato-scribiculatus vel (plerumque) auriculato appendiculatus," thus indicating the group as to-day accepted, including species in which there is a scar or excavation at base as well as those having appendages.

Steudel (Syn. Pl. Glum. 1 : 93. 1854) follows Trinius.

Bentham (Fl. Hongkong. 413. 1861) adopts *Ichnanthus* as a genus in this emended sense, including in it *I. pallens* (Sw.) Munro.

Grisebach (Fl. Brit. W. Ind. 550. 1864) gives it, in the same sense, as a section of *Panicum*.

Doell (Mart. Fl. Bras. 2² : 276. 1877) maintains *Ichnanthus* as a genus for the group segregated as *Panicum*, section *Ichnanthus* by Trinius, making under it two divisions "I Valvula inferior ad basin utrinque auriculatus" and "II Valvula inferior ad basin utrinque scribiculata."

Bentham (Benth. & Hook. Gen. Pl. 3 : 1103. 1883) and Hackel (Engler & Prantl, Pflanzenf. 2² : 36. 1887) maintain *Ichnanthus* as a genus for this larger group.

(Schultes, Mant. 2 : 281. 1824, misspells the name "*Ischnanthus*.")

Description.—Inflorescence paniculate, the spikelets mostly short-pediceled along the usually sub-simple branches; spikelets more or less laterally compressed, the glumes and sterile lemma strongly nerved; first glume usually more than half the length of the spikelet, broad, acute; second glume and sterile lemma subequal, acute, exceeding the fruit, the lemma enclosing a membranaceous palea and rarely a staminate flower; fruit acute or subacute, indurated, the margins of the lemma usually flat, the rachilla produced below the lemma into a usually minute stipe, this bearing on either side membranaceous appendages adnate to the base of the lemma and free above, the appendages sometimes wanting and indicated by minute excavations only. Perennials, usually with lanceolate blades abruptly contracted into a petiole-like base; the genus mostly confined to the tropics of the western hemisphere, one species extending into the Old World.

Ichnanthus is closely allied to *Panicum* and appears to be but a loosely coherent genus, several of the species differing from each other almost as much as some of them differ from species of *Panicum*. A few species, such as *I. lanceolatus* Scribn., in which the appendages are wholly wanting and even the scars obscure (but in which the lemma margins are flat), are nearly as referable to one genus as to the other.

19. GENUS LASIACIS (Griseb.) Hitchc.

Lasiacis Hitchc. Contr. Nat. Herb. 15 : 16. 1910. "The type of the genus is *Lasiacis divaricata* (L.) Hitchc., based on *Panicum divaricatum*

✓ 18+ *Microcalamus* Franch. (Stapf Hook. Gen. 31: pl. 3070. 1916 places this genus in *Panicæ*;

L., the type of Grisebach's section." The author raises *Panicum*, section *Lasiacis* Griseb. (Fl. Brit. W. Ind. 551. 1864) to generic rank. The type specimen of *Panicum divaricatum* L. (Syst. Nat. ed. 10. 2:871. 1759) was examined in the Linnaean Herbarium. It was collected by Browne in Jamaica.

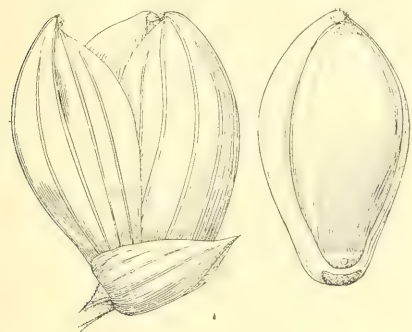


Fig. 11.
Lasiacis divaricata.
(Spikelet and fruit x 10 diam.)

Description.—Inflorescence of open, rarely compact, panicles at the ends of the culm and branches; spikelets subglobose, placed obliquely on their pedicels, the glumes and sterile lemma broad, abruptly apiculate, papery-chartaceous, shining, many nerved, glabrous, or lanose at the apex only, the first glume rarely over $\frac{1}{3}$ the length of the spikelet, somewhat inflated-ventricose, the second glume and sterile lemma subequal or the glume slightly shorter, the lemma enclosing a membranaceous palea and sometimes a staminate flower; fruit white, bony-indurated, obovoid, obtuse, both lemma and palea bearing at the apex in a slight crateriform excavation, a tuft of woolly hairs, the palea concave below, gibbous above, the apex often free at maturity. Large perennials, usually with freely branching, woody culms, often forming tall half-shrubs; leaf-blades firm, often narrowed to a petiole-like base; a genus of some fifteen species confined to the tropics and subtropics of the western hemisphere.

This genus is unusually well marked, the spikelets particularly of all the species being strikingly similar.

Besides the species placed in this genus by Hitchcock (Contr. Nat. Herb. 15: 16. 1910 and Bot. Gaz. 51: 301, 302. 1911) the following North American species, taken from the manuscript revision of the genus *Lasiacis*, are here transferred:

Lasiacis liebmanniana (Fourn.) Hitchc.

Panicum liebmannianum Fourn. Mex. Pl. 2: 33. 1886.

= *Sorghoidea*

Lasiacis oaxacensis (Steud.) Hitchc.

Panicum oaxacense Steud. Syn. Pl. Glum. 1: 73. 1854.

Lasiacis ruscifolia (H. B. K.) Hitchc.

Panicum ruscifolium H. B. K. Nov. Gen. & Sp. 1: 110. 1816.

Lasiacis rhizophora (Fourn.) Hitchc.

Panicum rhizophorum Fourn. Mex. Pl. 2: 31. 1886.

Lasiacis procerrima (Hack.) Hitchc.

Panicum procerrimum Hack. Oesterr. Bot. Zeitschr. 51: 431. 1901.

20. GENUS SACCIOLEPIS Nash.*

Sacciolepis Nash in Britton, Man. 89. 1901. Based on a single species, *S. gibba* (Ell.) Nash, which is the same species as *Holcus striatus* L., the latter name being later transferred to *Sacciolepis* by Nash to replace *S. gibba*.

21. GENUS HYMENACHNE Beauv.

Hymenachne Beauv. Ess. Agrost. 48. t. 10. f. 8. 1812. The type species is *Agrostis monostachya* Poir., which is the same as *H. amplexicaulis* (Rudge) Nees.

22. GENUS HOMOLEPIS gen. nov.

Inflorescentia paniculata; spiculae majusculae subfusiformes; glumae subaequales vel prima paulum longior, 7-9 nerviae, flosculos (et sterilem et fertilem) occultantes; lemma sterile vix glumis aequilongum, latius fertili idque amplectens et paleam angustam hyalinam includens atque interdum florem cum staminibus; fructus ellipticus acutus laevis nitidus; lemmate paleaque quam in *Panicum* minus induratis, lemmatis marginibus planis.

Herbae perennes, stoloniferae, nodis radicales; culmae floriferae basi plus minusve decumbentes.

Nomen a *ὁμοιος similis*, et *λεπίς squama*.

Inflorescence paniculate; spikelets rather large, subfusiform; first and second glume equal or the first slightly the longer, 7- to 9-nerved, the pair wholly covering the sterile and fertile florets; sterile lemma nearly as long as the glumes, broad, enfolding the fertile lemma, and enclosing a narrow hyaline palea and sometimes a staminate flower; fruit elliptic, pointed, smooth and shining, the lemma and palea less indurated than in *Panicum*, the margins of the lemma flat.

Perennials, sending out long leafy runners, rooting at the nodes, the flowering culms more or less decumbent at base. Confined to the tropics of the western hemisphere. Name from *ὁμοιος*, alike, and *λεπίς*, scale.

Type *Panicum aturense* H. B. K.

Homolepis aturenensis (H. B. K.)

Panicum aturense H. B. K. Nov. Gen. & Sp. 1: 103. pl. 33. 1816. "Crescit ad cataractas Aturenensis." The type specimen, in the Bonpland Herbarium in the Muséum d'Histoire Naturelle at Paris, consists of a simple flowering culm, decumbent at base. The label bears the name and data as published.

Panicum viridiflorum Nees, Agrost. Bras. 135. 1829. Habitat unknown to Nees. The type specimen in the Berlin Herbarium is labeled "Hb. Nees. *Panicum viridiflorum*. *Panicum aturense* Kth.," followed by a diagnosis. Nees distinguishes his plant from *P. aturense* by the 7- to 9-nerved glumes and sterile lemma, these being erroneously described by Kunth as 3-nerved.

* This and the following genus were discussed and the spikelets of the type species figured in Proc. Biol. Soc. Wash. 21: 1-10. 1908; only a summary is here given.

mostly

not so in
longispicata

look up
Panicum
clyrachne!

Panicum blepharophorum Presl, Rel. Haenk. 1:312. 1830. "Hab. in Mexico." The type specimen is in Presl's Herbarium in the Bohemian National Museum at Prague.

Panicum tumescens Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3²: 316. 1834. No locality other than Brazil is given. In the Trinius Herbarium is a specimen collected by Riedel in Bahia, Brazil, in 1831, marked by

Trinius "*Panicum tumescens* m.," which is no doubt the type.

Milium orinoccense Willd.; Steud. Nom. Bot. ed. 2. 2:146. 1841. This is given as a synonym of *Panicum aturense* H. B. K.

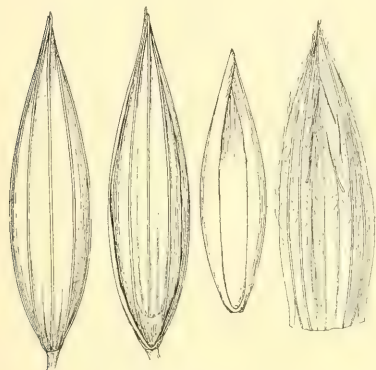


Fig. 12.
Homolepis aturense.
(Two views of spikelet, fruit and sterile
lemma $\times 6\frac{2}{3}$ diam.)

Homolepis isocalycina (Meyer). el

Panicum isocalycitum Meyer, el
Prim. Fl. Esseq. 59. 1818. "In arenosis umbrosis continentis" Essequibo [British Guiana]. A specimen of this sent by Meyer was examined in the Trinius Herbarium.

Panicum Langei Fourn. Mex. Pl. 2: 23. 1886. "*Teotalcingo* (LIEBM. n. 435. junio)." The type specimen is in the herbarium of the

Botanical Garden of the University at Copenhagen.

In the National Herbarium there is a specimen of *H. isocalycina* collected by Salzmann in Bahia, Brazil, and distributed without number, as "*Panicum zizanoides* H. B. K." It is distinguished from *H. aturense* by the slightly shorter, more turgid spikelets, with a glabrous sterile lemma and more indurated fruit.

Homolepis longispicula (Doell).

Panicum longiflorum Trin. Mém. Acad. St. Pétersb. VI. Sci. Nat. 3²: 317. 1834, not Gmel. 1796. No locality other than Brazil is given. In the Trinius Herbarium is a packet of spikelets marked "*Panicum longiflorum* m. Brasil," and a specimen bearing the same name and also "no. 147. Lect.—?"

Panicum longispiculum Doell in Mart. Fl. Bras. 2²: 261. 1877. "Habitat in Brasilia, loco accuratius non adnotato (herb. Acad. Petropolit.)." Doell cites "*Paspalum longiflorum* Trinius in Act. Petrop. 1835. p. 307 non Gmelin Syst. Veg. I. 158." This must be an error for *Panicum* since there is no *Paspalum longiflorum* of Trinius nor of Gmelin. The page reference is also erroneous. Evidently Doell's name is a typonym of *Panicum longiflorum* Trin.

Ichnanthus longiflorus Benth. Journ. Linn. Soc. Bot. 19: 45. 1881. This is based on "*Panicum longiflorum* Trin",, though from his statement that "in *I. longiflora* (*Panicum longiflorum*, Trin.) they [the auricles] are very

small, but prominent" it seems probable that Bentham had some other species under this name. The fertile lemmas in the spikelets of this species in the Trinius Herbarium are not at all auricled nor are the spikelets, with their villous-margined second glumes and villous sterile lemmas, suggestive of *Ichnanthus*. Both Trinius and Doell note the affinity of this species to *Panicum aturense*.

Homolepis longispicula differs from both the other species of this genus in having a densely silky-villous margin to the second glume, and a staminate flower in the first floret. The sterile (or staminate) lemma is densely villous, the fruit but little indurated as in *H. aturenensis*. The only collection of this of which we know other than that in the Trinius Herbarium is *Glaziou* 22470 from Brazil.

23. GENUS SCUTACHNE Hitchc. & Chase gen. nov.

Inflorescentia paniculata; spiculae breviter pedicellatae secus paniculae ramos teneros subsimplices dispositae, fusiformes, acuminatae, basi attenuatae, rachilla cum internodiis elongatis; gluma prima internodio rachillae imo stipitiformi adnata, quam spicula dimidio brevior, membranacea, marginibus basin versus connatis; gluma secunda lemmaeque sterile subaequilongae, internodio rachillae manifesto separata, coriacea indurata fusca, 5-nervia; lemma sterile palea et interdum staminibus praeditum; fructus quam gluma secunda lemmateque sterili, vix indurati, circumscriptione ellipticus, lemmate in mucronem pubescentem abrupte angustato, marginibus basin versus leviter involutis, sursum planis pubescentibus, parte paleae summa haud inclusa, margine dense pubescente.

Herbae perennes, tenues, culmis simplicibus, laminis linearibus, planis, et paniculis angustis.

Nomen a σκύτος *corium* vel *pellis*, et ἀχνη *palea*.

Inflorescence paniculate, the spikelets short-pediceled along the slender, simple or nearly simple branches; spikelets fusiform, acuminate, the base attenuate, the internodes of the rachilla elongated, the lowermost forming a stipe, the first glume adnate to it; first glume membranaceous, about half the length of the spikelet, broad, the margins connate below; second glume and sterile lemma subequal, a manifest internode of the rachilla between them, leathery-indurated, brown or brownish, 5-nerved, the lemma enclosing a palea of similar texture, (and in the type species a staminate flower); fruit but slightly more indurated than the second glume and sterile lemma, elliptical in outline, the lemma abruptly acuminate into a slender, densely pubescent tip, the margins slightly inrolled below, membranaceous, flat and pubescent above, the summit of the palea not enclosed, densely pubescent on the margin.

Slender perennials, with simple culms, linear, flat leaves and narrow panicles; known only from Cuba. Name from σκύτος, leather and ἀχνη, scale.

Type *Panicum durum* Griseb.

Scutachne differs from other genera of this tribe in having a second

glume and sterile lemma leathery-indurated and nearly as firm as the fruit. *Bluffia eckloniana* Nees (which is referable to *Alloteropsis*) and *Alloteropsis semialata* (R. Br.) Hitchc., especially the first, have sterile lemmas subindurated like their fruits but the two glumes are similar. The subindurated, mucronate fruit, the lemma margins membranaceous and flat above, the palea free at the summit, further differentiate *Scutachne* from *Panicum*.

Scutachne dura (Griseb.) Hitchc. & Chase.

Panicum durum Griseb. Mem. Amer. Acad. n. ser. 8 : 533. 1862. This was published in *Plantae Wrightianae e Cuba orientali*; the only citation given is "(1539)." The type specimen is in the Grisebach Herbarium.



Fig. 13.

Scutachne dura.

(Two views of spikelet and fruit x 10 diam.)

Scutachne amphistemon
(Wright) Hitchc. & Chase.

Panicum amphistemon Wright, Anal. Acad. Cienc. Habana 8 : 207. 1871. "Cerra de Mayarí abajo. [3464]." The type specimen, collected by Wright, in the Gray Herbarium, is labeled "Mayarí-abajo, Aug. 2, in small dense tufts."

These two species were placed in the genus *Alloteropsis* Presl by Hitchcock (Contr. Nat. Herb. 12 : 211. 1909) but further study has made this disposition of them appear an

unnatural one. *Alloteropsis* is unique among the *Panicæ* in having a minute prolongation of the rachilla beyond the fertile palea. This is not present in all specimens of *A. semialata* examined, though it seems to be constant in *Bluffia eckloniana*, but its usual presence, together with the awn-tipped glumes and lemma, the glumes of like texture, indicate a relationship too remote from the Cuban species to justify retaining them in *Alloteropsis*.

24. GENUS *ISACHNE* R. Br.

Isachne R. Br. Prod. Nov. Holl. 196. 1810. The genus is based on a single species, *I. australis* R. Br. collected by Brown in the vicinity of Port Jackson, Australia. The type has not been examined, but there is no reason to doubt that it is the common species of Australia and New Zealand, known under this name.

Isachne has usually been recognized as a valid genus ever since its pub-

lication. Sprengel (Syst. Veg. 1 : 314. 1825) describes a *Panicum antipodum* to which he refers *Isachne australis* R. Br. In his earlier works Trinius recognizes *Isachne* as a genus, but in his *Panicæarum Genera* (Mém. Acad. St. Pétersb. VI. Sci. Nat. 3² : 195, 328. 1834) he reduces it to a section of *Panicum*, and is followed by Steudel (Syn. Pl. Glum. 1 : 94. 1854).

Nees (Agrost. Bras. 96. 1829) gives "*Isachne* R. Br." as a synonym under the genus *Panicum*.

But it is to be noted that the only species of *Isachne* Nees had in his *Agrostologia Brasiliensis* was the anomalous *Panicum trachyspermum* Nees, which is an exception to the genus in that the lower floret is unlike the upper. Nees later (Seeman, Bot. Voy. Herald 224. 1857) places this species in *Isachne*.



Fig. 14.

Isachne australis.

(Two views of spikelet, florets with glumes removed, and upper fruit x 10 diam.)

Kunth and Bentham give *Isachne* generic rank, as do Doell, Grisebach and Hooker. Bentham (Fl. Austr. 7 : 624. 1878) places the genus (instead of in *Panicææ* as did all other authors) in his tribe "VI *Astreptæ*, subtribe *Miliææ*," together with *Sporobolus*, *Micraira*, and others, *Panicææ* being his first tribe. This disposition of the genus appears to have been based on what Bentham in the *Genera Plantarum* (3 : 1077, 1100) calls the subarticulated, persistent glumes, since in his introduction to the *Gramineæ* in the "Flora Australiensis" Bentham, emphasizing the importance in classification of the articulation of the spikelet, remarks that this character "settles the position of a few genera, *Polypogon*, *Milium*, *Isachne* etc. which might at first sight appear closely to connect the two great series." Later (Linn. Soc. Journ. Bot. 19 : 92. 1881) he proposes a "Tribe IX *ISACHNÆ*" with the statement that this is a modification of the subtribe proposed in the "Flora Australiensis" under the name *Miliææ*. *Milium* and *Sporobolus* are not here included. The tribe is placed between "AGROSTÆ" and "AVENÆ" and includes *Prionachne*, *Isachne*, *Zenkeria*, *Celachne*, *Airopsis*, *Micraira* and *Eriachne*, all except *Isachne* to-day included in *Avenææ*. Bentham notes the resemblance of *Isachne* to some species of *Panicum* but adds that the "species of *Isachne* * * constantly differ in the empty glumes persistent below the articulation, and in the two flowers both hermaphrodite or female, though one may be occasionally sterile." Hooker (Fl. Brit. Ind. 7 : 2, 21. 1896) says that the first and second glumes are separately deciduous and that the fourth glume (lemma of upper floret) is articulate on the rachilla. Hackel (Engler & Prantl, Pflanzenf. 2² : 35. 1887) in the diagnosis of *Isachne* says, "the fruiting glumes falling out of the persistent empty glumes." The examination of a large number of specimens scarcely verifies these statements. While the articulation below the glumes is not constant as in other genera of *Panicææ*, the spikelets appear to fall entire in at least about half the cases. The glumes appear

to be commonly separately deciduous, as stated by Hooker, the pair of florets joined together, being found persistent in mature panicles after one or both glumes have fallen. A number of specimens show persistent glumes from which the florets have fallen, but these are much fewer than the persistent florets from which the glumes have fallen. Several panicles have been found in which both of these occur, but in the great majority of cases the spikelets are either present entire, or wholly fallen—though the parts may have fallen separately. The second floret articulate on the rachilla, falling separately, appears from the examination of our specimens to occur only very rarely, and then only when the lower floret is staminate, or at least not perfecting a grain. It may here be noted that in *Panicum capillare* and its close allies the fruit frequently falls from the temporarily persistent glumes and sterile lemma, and that occasionally in *P. dichotomum* and its allies the glumes and sterile lemma fall, leaving the fruit for a short time persistent.

Benthams later (Benth. & Hook. Gen. Pl. 3 : 1077. 1883) places *Isachne* in the tribe *Panicææ*, immediately before *Panicum*, and Hackel (Engler & Prantl, Pflanzenf. 2² : 33, 35. 1887) also assigns it to this position.

Description.—Inflorescence paniculate; spikelets obovoid to subglobose; glumes membranaceous, subequal, about as long as the fruits or at maturity exceeded by these; lower floret perfect or staminate, its lemma and palea indurated and similar in form and texture to those of the upper floret (scarcely indurated and dissimilar in *I. trachysperma* Nees); both florets (or fruits) plano-convex, obtuse, equal or nearly equal in size (the lower often larger when staminate only), the pair usually remaining attached together by the minute rachilla joint below the upper floret. Perennials with simple or branching culms and flat blades, the species confined to the tropics and warm temperate regions of both hemispheres.

The lower floret often appears to be sterile (not perfecting a grain) in some and fertile in other spikelets on the same panicle. When sterile the floret is often longer and the lemma less convex than when fertile, the spikelets on the same panicle thus having a somewhat diverse appearance.

Several species of *Isachne* bear a superficial though striking resemblance to species of the North American *Panicum*, subgenus *Dichanthelium*.

25. GENUS HETERANTHOECIA Stapf.

Heteranthoecia Stapf in Hook. Icon. Pl. 30² : pl. 2927. 1911. The genus is based on a single species, *H. isachnioides* Stapf (l. c.) collected in "Tropical Africa: Northern Nigeria; Nupe, in swamps Barter, 1348: French Congo; Suessi Country (Chari oriental), at the sources of the Ndelle River, *Chevalier*, 6825." It is not stated from which collection the illustration was made. The genus differs from *Isachne* in having a racemose panicle, the sessile spikelets in short racemes, these arranged along a common axis, and in having florets with lemmas dissimilar in form and texture, though both fertile. Stapf considers the genus intermediate between *Isachne* and *Coelachne*, the latter an anomalous genus of the Old World at present placed in *Aveneæ*.

26. GENUS *OPLISMENUS* Beauv.

Oplismenus Beauv. Fl. d'Oware et Benin. 2: 14. pl. 58. f. 1. 1809.* Under the genus is described a single species, *O. africanus* (op. cit. 15), of which Beauvois says "J'ai trouvé cette espèce à Chamo, à Koto, à Oware et à Benin." He states that the genus is composed of several species of *Panicum* and notably those of which Persoon has made a division thus characterized: "*Spica composita, spiculis compressis secundis.*"



Fig. 15.
Oplismenus africanus.
(Two views of spikelet and
fruit x 10 diam.)

The species included by Persoon (Syn. Pl. 1: 82. 1805) in this division are *Panicum hirtellum*, *P. setarium*, *P. bromoides*, *P. cespitosum*, *P. loliaceum*, *P. compositum* and *P. elatius*. The type specimen of *O. africanus* has not been examined. The accompanying figure is made from Zenker & Staudt 515, collected in Kamerun, Africa, which is included in the region visited by Beauvois. (The generic name is misspelled "*Ophismenus*" in Poir.; Lam. Encyc. Suppl. 4: 271. 1816.)

Orthopogon R. Br. Prodr. Nov. Holl. 194. 1810. Four species are given under the genus, *O. compositus*, based on "*Panicum compositum* L.," *O. aemulus*, *O. flaccidus*, *O. imbecillis*. None being figured in the

same work and all being equally eligible the first is here taken as the type.

Cheeseman (Man. New Zeal. Fl. 849. 1906) refers *Hekaterosachne elatior* Steud. (from New Zealand), the type of the monotypic genus *Hekaterosachne* Steud., to *Oplismenus undulatifolius* Beauv. Dalla Torre and Harms (Gen. Siphonog. 14. 1900) also refer this name to *Oplismenus*. We have not seen Steudel's specimen. His description (Syn. Pl. Glum. 1: 118. 1854) does not well agree with *Oplismenus*, though it is possible that his description is erroneous.

Hippagrostis (Rumph.) Kuntze, Rev. Gen. Pl. 2: 776. 1891. Kuntze gives Rumpf as the author of the genus, with the date 1749. *Hippagrostis* Rumph. (Herb. Amb. 6: 14. pl. 5. f. 3. 1750) is based on a single species, *H. amboinica* Rumph. (l. c.), which the plate shows to be a species of *Oplismenus*, probably *O. burmannii*. Since a binomial species is given under the genus, only the fact that "Botanical nomenclature is treated as beginning with the general application of binomial names of plants (Linnaeus' Species Plantarum, 1753)" † renders *Hippagrostis* invalid for our use. In the Index Universalis (Herb. Amb. Auctuarium, 1755) the name *Hippagrostis amboinica* is given with reference to the 1750 work. Perhaps this might constitute publication.

*The title page is dated 1807. The date 1809 is taken on the authority of J. H. Barnhart as stated in a letter from G. V. Nash, to whom we are indebted for a transcript of pages 14 and 15 of the second volume of the Flore d'Oware.

† American Code of Botanical Nomenclature Part 1, principle 2.

Beauvois (Ess. Agrost. 54. 1812) amplifies his earlier generic description and transfers to the genus several species from *Panicum*. He places *Oplismenus* immediately after *Echinochloa*.

Kunth (H. B. K. Nov. Gen. & Sp. 1 : 106. 1816) recognizes *Oplismenus* as a genus, including under it as synonymous *Orthopogon* R. Br. and *Echinochloa* Beauv. The same is done in his later works (Rév. Gram. 1 : 43. 1829; Enum. Pl. 1 : 138. 1833).

Desvaux (Opusc. 81. 1831) follows Kunth, but also includes *Panicum semialatum* in the genus.

Trinius (Fund. Agrost. 181. 1820) recognizes *Orthopogon* R. Br. as a genus, referring *Oplismenus* to it as a synonym.

Raddi (Agrost. Bras. 40. 1823) recognizes *Oplismenus*.

Trinius (Gram. Pan. 51, 153. 1826; Mém. Acad. St. Pétersb. VI. Sci. Nat. 3² : 209. 1834) reduces *Orthopogon* to a section of *Panicum*.

Nees (Agrost. Bras. 255. 1829; Fl. Afr. Aust. 60. 1841 * gives *Oplismenus* generic rank.

Steudel (Syn. Pl. Glum. 1 : 44. 1854) follows Trinius in making *Orthopogon* a section of *Panicum* and giving *Oplismenus* as a synonym.

Hasskarl (Cat. Pl. Hort. Bogor. Alt. 16. 1844) and Schlechtendal (Linnaea 31 : 263. 1861) spell the generic name *Hoplismenus*.

Bentham (Fl. Hongkong 409, 411. 1861) includes *Oplismenus* in *Panicum*, but later (Fl. Austr. 7 : 491. 1878) he gives it (with *Orthopogon* as a synonym) generic rank "with the limits originally assigned to it by Beauvois and by Brown," that is excluding *Panicum crusgalli* and allies referred to it by Kunth.

Grisebach (Fl. Brit. W. Ind. 544. 1864) recognizes *Orthopogon* as a genus for the group thus circumscribed, and Doell (Mart. Fl. Bras. 2² : 144. 1877) includes *Orthopogon*, in the same sense, as a section of *Panicum*, giving *Oplismenus* as a synonym.

Bentham (Benth. & Hook. Gen. Pl. 3 : 1077, 1104. 1883) gives *Oplismenus* generic rank as does Hackel (Engler & Prantl, Pflanzenf. 2² : 33, 36. 1887).

Fournier (Mex. Pl. 2 : 37. 1886) maintains *Oplismenus* as emended by Kunth, that is, including *Echinochloa*.

Dalla Torre and Harms (Gen. Siphonog. 14. 1900) give the name *Paniculum* Ard. as a synonym of *Oplismenus*. The name "*PANICULUM undulatifolium*" occurs in Arduini (Animadv. Bot. Spec. 2 : 14. pl. 4. 1764), but the generic name is an error for *Panicum*. The name printed on the plate is *Panicum undulatifolium*.

Description.—Inflorescence of few to many unilateral racemes, approximate or distant along a common, often flexuous axis, the racemes bearing many crowded or subdistant spikelets, or sometimes very short and bearing a single cluster; spikelets terete or somewhat compressed laterally, subsessile, in pairs or solitary in two rows on one side of a narrow, scabrous or hairy rachis; glumes subequal, emarginate or 2-lobed (rarely entire), awned or mucronate from between the lobes; sterile lemma ex-

* The second edition of this work was published in 1853 with the title "Agrostographia Capensis." The pagination is the same in both.

ceeding the glumes and fruit, notched or entire, mucronate or short-awned, enclosing a hyaline palea; fruit elliptic, acute, the lemma very convex or boat-shaped, the firm margins clasping the lemma, not inrolled. Usually weak, freely branching, creeping or ascending annuals or perennials, with flat, thin, lanceolate blades, the species confined to the tropics and warm temperate regions of both hemispheres.

In this genus the awns are variable in length in the same species.

27. GENUS ECHINOCHLOA Beauv.

Echinochloa Beauv. Ess. Agrost. 53. pl. 11. f. 2. 1812. The first of several species of *Panicum* listed under this genus, and in the index (page 161) transferred to it, and the one figured is *E. crusgalli* (L.) Beauv., which is taken as the type. This species is based on *Panicum crusgalli* L. (Sp. Pl. 56. 1753) "*Habitat* in Europæ, Virginie *cultis*." The only specimen in the Linnaean Herbarium to which Linnaeus has attached the name is one of the ordinary small form of this species.* This is marked "K" indicating that it was collected by Kalm in America.

Adanson (Fam. Pl. 2: 496. 1763) proposes a genus *Tema* with the differentiating diagnosis "Corolla obtuse or aristate on the exterior scale of the sterile flower." No binomial is cited. The authority for the genus is given as "H[ort.] M[alab] 12. t. 79" (which would indicate that Adanson adopts the genus from that work), and "*Panicum* Rumph. 5. t. 76. f. 2." and "*Gramen panicum spica divisa* C. B." [Caspar Bauhin] are cited. The last citation refers to *Panicum crusgalli* L. and is also given by Linnaeus under that species (Sp. Pl. 56. 1753). The plant described and figured in Rheedee (Hort. Malabar. 12: pl. 79. 1703) is *Chaetochloa italica* (L.) Scribn. and the name there given it is *Tenna*, of which *Tema* would appear to be an erroneous transcript. The plant illustrated in Rumphius (Herb. Amb. 5: pl. 76. f. 2. 1747) is *Eleusine indica*. If Adanson



Fig. 16.
Echinochloa crusgalli.
(Two views of spikelet and fruit
x $7\frac{1}{2}$ diam.)

meant to unite these species in a single genus, as would appear to be the case, the name *Tema* would go with the first reference, and, since this is not associable with a previously published binomial the genus is not technically published. It is possible that the reference given to Rumphius is an error for plate 75, figure 2, this being an illustration of *Chaetochloa italica*.

* See Hitchcock, Contr. Nat. Herb. 12: 117. 1908.

Trinius, Nees, and Steudel, of the earlier authors, include *Echinochloa*, usually as a section, in *Panicum*.

Kunth (H. B. K. Nov. Gen. & Sp. 1 : 106. 1816; Rév. Gram. 1 : 43. 1829; Enum. Pl. 1 : 138. 1833) and Desvaux (Opusc. 81. 1831) include it under *Oplismenus*.

Roemer & Schultes (Syst. Veg. 2 : 476. 1817), Schultes (Mant. 2 : 266. 1824), and Link. (Hort. Berol. 2 : 208. 1833) give *Echinochloa* generic rank, but the latter adds (op. cit. 209) "Genera *Echinochloa* et *Panicum* artificialia sunt, nec natura distincta."

Of the later authors Bentham (Fl. Hongkong 411. 1861; Fl. Austr. 7 : 478. 1878; Benth. & Hook. Gen. Pl. 3 : 1102. 1883), Grisebach (Fl. Brit. W. Ind. 545. 1864), Doell (Mart. Fl. Bras. 2² : 139. 1877) and Hackel (Engler & Prantl, Pflanzenf. 2² : 35. 1887) include *Echinochloa* in *Panicum*. Fournier (Mex. Pl. 2 : 39. 1886) includes *E. crusgalli* and its close allies in *Oplismenus*, but *Oplismenus holciformis* H. B. K., a long-awned species allied to *E. spectabilis* (Nees) Link, he places in *Berchtoldia* (misspelled "*Berchtholdia*"). In his key to *Panicææ* (op. cit. 3) Fournier distinguishes *Berchtoldia* from *Oplismenus* by the "remote inferior glume." (Both genera are included under "Spiculis involucreatis; involucre constante e spiculis abortivis," as opposed to "e chaetocladis" including *Setaria*, *Pennisetum*, etc. What Fournier could have mistaken for an involucre of abortive spikelets is not evident.)

Nash (Britton, Man. 78. 1901; Small, Fl. Southeast. U. S. 84. 1903) and Hitchcock (Gray, Man. ed. 7. 117. 1908) recognize *Echinochloa* as a valid genus.

Description.—Inflorescence paniculate, the usually compact, densely flowered panicle composed of one-sided simple racemes or of subsimple branches; spikelets plano-convex, often spiny-hispid, subsessile, solitary or in irregular clusters on one side of the panicle branches; first glume about half the length of the spikelet, pointed; second glume and sterile lemma equal, pointed, mucronate, or the glume short-awned, the lemma long-awned, in some species conspicuously so, enclosing a membranaceous palea and sometimes a staminate flower; fruit plano-convex, the lemma and palea smooth and shining, acuminate-pointed, the lemma margins inrolled below, flat above, the apex of the palea not enclosed. Coarse, often succulent annuals, with compressed sheaths and linear, flat blades; species of the temperate and tropical regions, two species cosmopolitan.

In this genus the awn of the sterile lemma is exceedingly variable in length, sometimes even in the same plant. *Echinochloa* is distinguished from *Panicum* constantly by the plano-convex, pointed fruit, the lemma margins flat above, the apex of the palea free, and usually by the awned sterile lemma.

A Mexican species described under *Oplismenus* belongs to this genus:

***Echinochloa holciformis* (H. B. K.).**

Oplismenus holciformis H. B. K. Nov. Gen. & Sp. 1 : 107. 1816. "Crescit in humidis montanis prope Cinapecuario, alt. 970 hexap. (Regno Mexi-

cano.)” A duplicate type, received from Humboldt, was examined in the Willdenow Herbarium. Of the specimens in the National Herbarium Pringle 8622 is an excellent match for this. The other specimens mostly have longer awns.

Orthopogon holciformis Spreng. Syst. Veg. 1 : 307. 1825. Based on “*Oplismenus holciformis* Kunth.”

Panicum holciforme Steud. Nom. Bot. ed. 2. 2 : 257. 1841. Based on *Oplismenus holciformis* H. B. K.

Berchtoldia holciformis Fourn. Mex. Pl. 1 : 41. 1886. Based on “*Oplismenus holciformis* H. B. K.”

28. GENUS CHAETIUM Nees.

Chaetium Nees, Agrost. Bras. 269. 1829. This genus is based on a single species, *C. festucoides* Nees (op. cit. 270), “Habitat in graminosis et in cultis ad flumen S. Francesci, ad Joazeiro etc. Provinciarum Pernambucanae et Bahiensis.” The type specimen, in the Munich Herbarium, bearing the data as published, was collected by Martius.

Berchtoldia Presl, Rel. Haenk. 1 : 323. pl. 43. 1830. A single species is included in the genus, *B. bromoides* Presl. (op. cit. 324). “Hab. in Mexico.” A part of the type specimen was examined in the Trinius Herbarium.

Both Nees and Presl place their proposed genera next after *Oplismenus*.

Kunth (Enum. Pl. 1 : 146. 1833) places *Chaetium festucoides* in *Oplismenus* but to *Berchtoldia* he gives generic rank. After the generic description he adds “(Charact. gen. ex Presl.)” It is probable that Kunth had not seen either species, but that from the plate in Presl’s work he recognized *Berchtoldia* as distinct from *Oplismenus*.

Steudel (Syn. Pl. Glum. 1 : 48. 1854) places *Chaetium* in *Panicum*, section *Echinochloa* under the name *P. chaetium*, and gives (op. cit. 117) *Berchtoldia* generic rank, as did Kunth, and doubtless for the same reason.

Doell (Mart. Fl. Bras. 2² : 150. 1877) makes *Chaetium* a section of *Panicum* with the single species *P. chaetium* Steud. In the observations (op. cit. 150) he mentions as belonging in this section *Berchtoldia bromoides* Presl, to which he gives the name *Panicum berchtoldium*. Under *P. chaetium* he mentions as an extra-Brazilian specimen Wright 735 from eastern Cuba. This number is the type of “*Perotis ? cubana*” Wright, *Chaetium cubanum* (Wright) Hitchc.

Bentham (Linn. Soc. Journ. Bot. 19 : 46. 1881; Benth. & Hook. Gen.



Fig. 17.
Chaetium festucoides.
(Two views of spikelet
and fruit x 5 diam.)

Pl. 3 : 1077, 1104. 1883) recognizes *Chaetium* as a valid genus, as does Hackel (Engler & Prantl, Pflanzenf. 2² : 33, 36. 1887) both placing it immediately after *Oplismenus*.

Hemsley (Biol. Cent. Amer. Bot. 3 : 503. 1885) transfers *Berchtoldia bromoides* to *Chaetium* giving Benthams authority with a reference to the Linnaean Society's Journal mentioned above, but Benthams did not there transfer the species.

Fournier (Mex. Pl. 2 : 40. 1886) gives *Berchtoldia* as a genus, including in it Presl's species, and also two species of *Echinochloa*.

Description.—Inflorescence a dense, narrow panicle; spikelets short-pedicel, dorsally compressed, lanceolate and having a long, slender callus-like base from the elongation of the joint of the rachilla between the glumes, the bearded base of the first glume adnate to it; glumes bearing awns 3 to 4 times the length of the body of the spikelet, the first reduced to the awn or, in *C. bromoides*, the pair broadened and enclosing the rest of the spikelet; sterile lemma bearing a shorter awn or awn-tipped only, the sterile palea obsolete; fruit subindurated, lanceolate, the lemma acuminate into a scabrous awn or point, the thin margins flat, the summit of the palea not enclosed. Perennials with long, narrow leaves; the genus containing but three known species, one of Mexico and Central America, one of Cuba, and one of Brazil.

29. GENUS TRICHOLAENA Schrad.

Tricholaena Schrad. in Schult. Mant. 2 : 163. 1824. Three species are included in the genus but the second and third are preceded by a question mark, hence the first, *T. micrantha* Schrad., of which *Saccharum teneriffæ* is given as a synonym, is the type.

Rhynchelytrum Nees in Lindley, Nat. Syst. ed. 2. 446. 1836. The genus is described and a single species, *R. dregeanum*, given. We have not seen the type specimen but the generic description applies to *Tricholaena*. Stapf (Dyer. Fl. Cap. 7 : 444. 1898) refers *R. dregeanum* to *T. rosea* Nees.

Monachylon Parl. in Hook. Niger Fl. 190. 1849. A single species, *M. villosum*, is included. The type specimen has not been examined. Hackel (Engler & Prantl, Pflanzenf. 2² : 36. 1887) gives this as a synonym of *Tricholaena*, and Durand and Schinz (Consp. Fl. Afr. 5 : 771. 1895) transfer *M. villosum* to this genus. Making allowance for a misunderstanding of the structure of the spikelet, owing to the remote first glume, the description applies to *Tricholaena*.

The scarcely indurated fruit, scarcely firmer than the usually 2-lobed and awned second glume and sterile lemma, together with the elongation of the rachilla joint between the glumes, serve to distinguish this Old World genus, a single species of which, *T. rosea* Nees, is sparingly escaped from cultivation in the tropics and subtropics of North America.

30. GENUS CORIDIOCHLOA Nees.

Coridochloa Nees, Edinb. New Phil. Journ. 15 : 381. 1833. This genus is based on a single species, "*Coridochloa* * * * *cujus typus est*

Valid

Panicum cimicinum Retz.” Nees states that the genus is allied to *Anthænantia* Beauv., but is distinguished by the two-flowered spikelets, the fertile floret aristate.

Bentham (Fl. Austr. 7 : 473. 1878) gives “*Coridochloa semialata*, Nees in various catalogues and herbaria” as a synonym of *Panicum semialatum* R. Br., and adds “(the genus not published as generally quoted in Edinb. New Phil. Journ. 1832, July).” It would seem that Bentham must have cited this name and reference from memory. We can not find that Nees himself ever placed *P. semialatum* in *Coridochloa*, nor can we find any reference to the publication of the genus in 1832. It was probably a slip of memory on Bentham’s part for 1833. The genus *Coridochloa* is proposed in a footnote with the statement that it will be treated of at another time, hence Bentham may have considered it as insufficiently published. But Nees states that the genus belongs in the tribe *Panicæ*, names a type species, previously described, and gives the principal distinguishing characters of the spikelet. In Wallich’s Catalogue (1849) no. 8749 “*Coridochloa fimbriata* Nees ab Esenbeck” is listed, “*A. Milium cimicinum* Hb. Heyn.” and “*B. Panicum cimicinum* Hb. Ham.” being given under it. (In a note on page 132 of the Catalogue it is stated that “Mr. Brown * * * has had the goodness * * * to furnish the provisional list of the family” of grasses). In a criticism of Nees, Bentham (Linn. Soc. Journ. Bot. 19 : 18. 1881) again says “Brown’s Australian *Panicum semialatum*, for instance, is raised by Nees to the rank of a genus under the name of *Coridochloa* in India, and that of *Bluffia* in South Africa.” It may be that Bentham did not know *Panicum cimicinum* Retz., for (op. cit. 42) he says “*P. semialatum* Br. is widely spread over the Old World, for I am unable to distinguish the Asiatic *Coridochloa*, Nees, and the South African *Bluffia*, Nees, from Brown’s Australian species.”

Hooker (Fl. Brit. Ind. 7 : 64. 1896) places *Panicum cimicinum* and *P. semialatum* under *Axonopus* Beauv. (See discussion under that genus.) Under the second species is given as a synonym “*Coridochloa semi-alata*, Nees, in Edinb. New Phil. Journ. XV. (1833) 381.” This is an error, Nees makes no mention whatever of *P. semialatum* nor of any species but *P. cimicinum* Retz.

This unique species has been placed in *Milium* (by Linnaeus) in *Panicum* (by Retzius), in *Axonopus* (by Beauvois), in *Urochloa* (by Kunth), and finally in *Coridochloa*, based on it alone, by Nees.

Coridochloa, which is perhaps rather remotely allied to the next genus, is distinguished by the concavo-convex, scarcely indurated, stipitate fruit, the lemma attenuate into an awn about as long as the body of the fruit, the palea sparsely covered with stalked glandular hairs (in appearance like minute fungi), a few of these sometimes scattered on the margin of the lemma; by the papery glumes and sterile lemma, the second glume conspicuously stiff-ciliate along the lateral internerves, and by the digitate inflorescence, the slender racemes naked at the base or for half their length.

31. GENUS ALLOTEROPSIS Presl.

Alloteropsis Presl, Rel. Haenk. 1 : 344. pl. 47. 1830. A single species, *A. distachya*, is included in the genus which is erroneously described. Scribner (Mem. Mo. Bot. Gard. 10 : 37. pl. 33. 1899) and Hitchcock (Contr. Nat. Herb. 12 : 210. 1909) explain the error and emend the genus. Presl's type specimen was examined and photographed in the National Museum at Prague by Professor Hitchcock. It is the same species as *Panicum semialatum* R. Br. (Prodr. Nov. Holl. 192. 1810), *Alloteropsis semialata* Hitchc. (l. c.). There are two plants of the same species on the sheet, one with a ticket marked "Peruanæ montanæ" the other with one marked "Regio montana, Luzon." The Peruvian locality is clearly erroneous.

Bluffia Nees, Del. Sem. Hort. Hamb. 8. 1834. The genus is described and a single species, *B. eckloniana* Nees, "ab Ecklono * * * in Africa australi detecti," included under it. By Hackel (Durand & Schinz, Consp. Fl. Afr. 5 : 764. 1895), this species is reduced to a variety of *Panicum semialatum*; by Hooker (Fl. Brit. Ind. 7 : 64. 1896) it is referred to *Axonopus semialatus* as a synonym, and by Stapf (Dyer, Fl. Cap. 7 : 418. 1898) it is reduced to a variety of that species. To us it appears to be specifically distinct.

Holosetum Steud. Syn. Pl. Glum. 2 : 118. 1854. This is based on a single species, *H. philippicum* Steud. "Herbr. Cuming nr. 1363 et 1414. Ins. Philip." Cuming's no. 1363 was examined in the Kew Herbarium. It proves to be *Alloteropsis semialata*.

This genus of two known Old World species does not appear to be closely allied to any other. The two subindurated, awn-pointed florets to some appear to suggest species of *Arundinella*, under which genus Bentham (Fl. Austr. 7 : 545. 1878) describes a specimen of *Alloteropsis semialata*, as *Arundinella Schultzii* Benth., though he gives *Panicum semialatum* on page 472 of the same work. In both species of this genus, as shown by specimens in the National Herbarium, there is not infrequently found a rudiment, 0.3 mm. or more long, beyond the palea of the fertile floret.

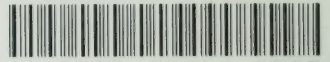
see Maiden
& Betche

The genus is distinguished by the awn-pointed, similarly subindurated staminate and fertile florets, the margins of the fertile lemma thin, flat, the palea not enclosed at the summit, in combination with the subdigitate inflorescence, the short-pedicelled spikelets in clusters along the racemes.

The involucrate genera and the others excluded under the first and second divisions of the key will be considered in a subsequent paper now in preparation.



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